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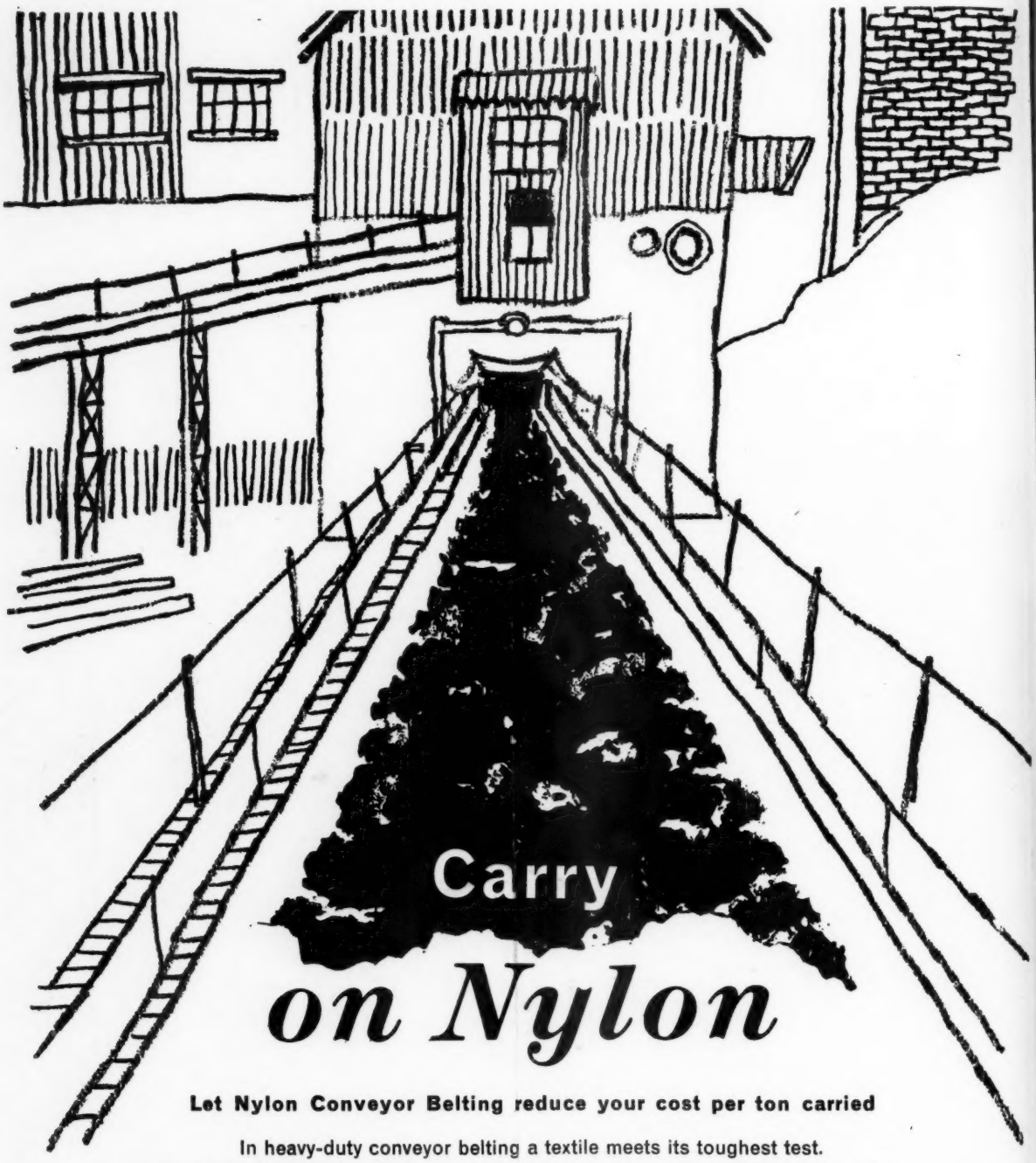

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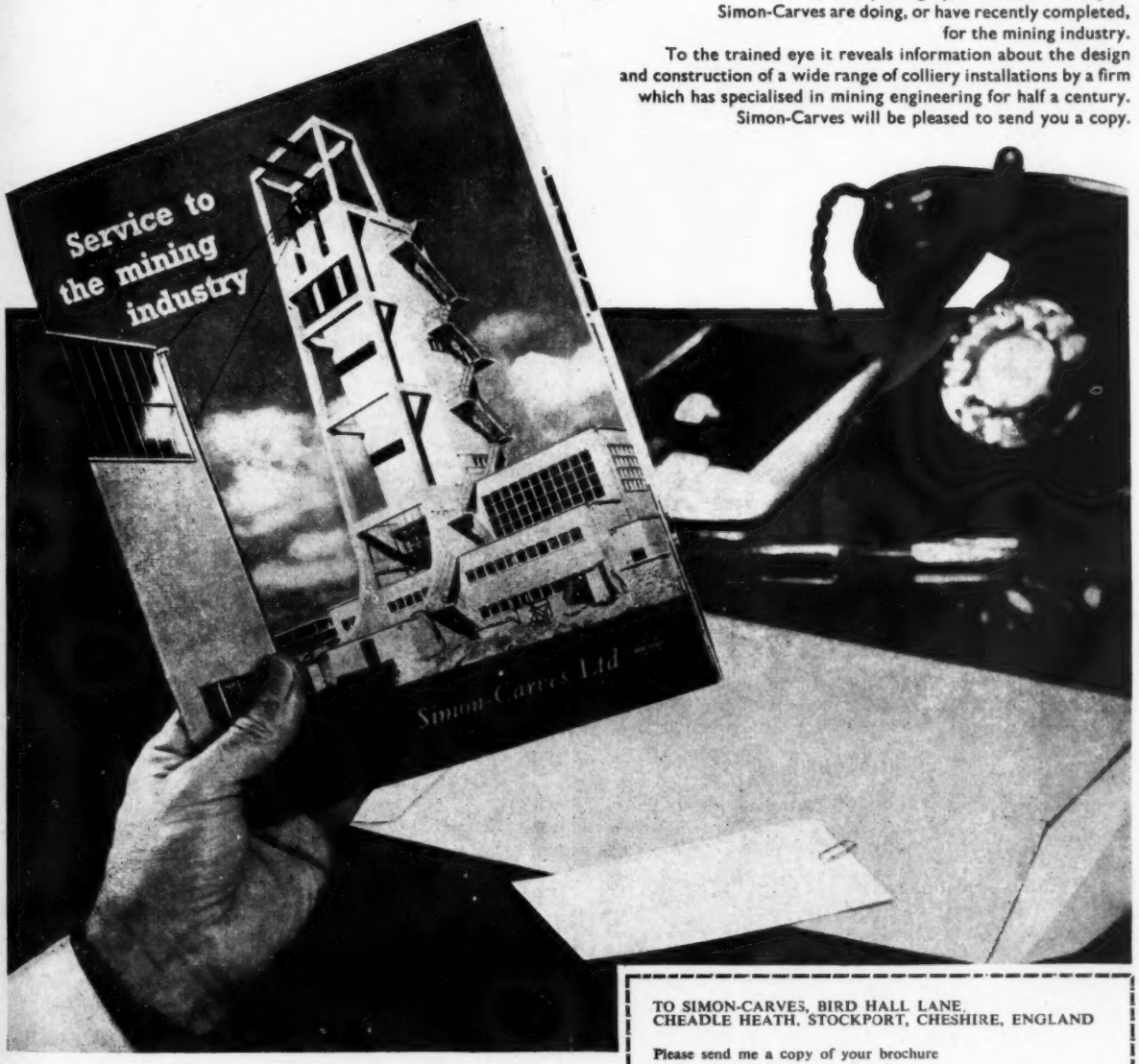

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In this issue . . .

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Magnesium Seeks New Markets

IN common with the other light metals, aluminium and titanium, magnesium was, until quite recently, under a cloud, due in part to the general industrial recession, but also to the slackening in military demand. Its difficulties were accentuated by the decline in titanium production, in which magnesium is used as a reducing agent, and also by the fall in price of its principal competitor, aluminium. These adverse conditions were reflected by a fall of 21 per cent in U.S. consumption in 1958 as compared with the previous year, and of some 35 per cent in world production.

For magnesium, again as with the other light metals, 1959 has witnessed the turn of the tide. In the U.S. consumption of primary magnesium is generally estimated at around 45,000 s. tons, although, partly as a result of the steel strike, there is a possibility of a slightly lower figure. At worst, shipments of primary ingot are expected to be more than 30 per cent higher than the 34,100 tons shipped in 1958. In view of the industrial recovery in Britain and Europe, it can also be anticipated that consumption outside the U.S. will show a very useful gain.

Based on the latest estimates for 1959, the consumption of magnesium has risen by more than 350 per cent since 1949, when U.S. shipments were just under 12,000 s. tons. Although percentage-wise this gain may seem impressive, the present level of consumption is considerably less than the industry would like to see. At the end of 1959 the two producing companies in the U.S. will have a combined capacity of some 90,000 tons of primary ingot annually, or roughly twice the level of current demand, and in addition there is a government-owned plant of several thousand tons.

Magnesium, once again like aluminium, is thus in a position to embark upon an all-out drive for new markets, with the knowledge that sufficient unused capacity exists to meet all demands in the foreseeable future. At the annual convention of the Magnesium Association in October, 1959, Mr. James S. Kirkpatrick, vice-president of Brooks and Perkins, maintained that no other metal had ever been so readily available and added that, extensive market research having established its merits for many sound uses, magnesium was now at the stage where volume production could reduce costs to the point where it would be competitive for many new applications.

Mr. Kirkpatrick recalled that ten years ago Dr. Willard H. Dow, of Dow Chemical Co., had listed more than two-score potential future uses for magnesium in addition to ones which had already been established. Today thirty of these suggested items were successfully in use, he stated, and only seven items had been tried which for one reason or another were technically unsound, though some had been placed on the shelf because they could not be marketed economically. Citing the famous B-36 bomber as the vehicle which served as a trail blazer and soundly established magnesium as a structural material, he said that the later B-52 heavy bomber utilized some 3,600 lb. of magnesium alloys in the form of extrusions, forgings, sheet and castings.

One of the difficulties with which producers have been confronted is that, until quite recently, magnesium has continued to be regarded

more or less as primarily a material associated with the defence and military market. U.S. distribution statistics for 1958 show a consumption of about 9,800 tons of magnesium in the manufacture of aircraft and missiles against only about 2,300 tons for consumer goods. Moreover, a mere 800 tons went into surface vehicles, which constitute a growing outlet for aluminium and are potentially one of magnesium's largest markets. Volkswagen is the world's biggest single consumer of magnesium.

A particularly encouraging feature of magnesium's progress in 1959 has been the substantial improvement in U.S. civilian demand, which now probably balances defence and military use. Commercial use is expected to expand still more rapidly in the next two years, as the industry accelerates its programme of research and market development.

The fact that, with the establishment of Alabama Metallurgical Corporation as a magnesium producer, the U.S. now has two primary producers, is regarded as being in itself a bull point for magnesium, since it eliminates a previous objection on the part of some users to the more extensive use of this metal, namely dependence on one source of supply. The existence of two U.S. producers will also help to spread the burden of research.

Magnesium's technological advances in the past decade and its far from inconsiderable gains in consumption and usage bear eloquent testimony to the faith and vision of the Dow Chemical Co., Magnesium Elektron, Ltd., and other leading members of the industry. It is nevertheless conceded that, in the past, there has been insufficient promotional effort to acquaint the metals-using industries of the advantages, qualities and uses of magnesium in commercial products. For more than a year, however, the industry and the Magnesium Association have been laying the groundwork for stepping up educational and promotional effort. Marketing areas are regarded as wide open and it was stated at the conference that nine out of ten major users of magnesium questioned were highly optimistic about the future of the metal. There appeared to be general agreement that in view of the acceleration of the military programme, increasing production of missiles, and a growing use in civilian applications, the present annual consumption of magnesium and its alloys could be very greatly increased.

TRADE IN EASTERN EUROPE

Several trade agreements of interest to the mining world have been concluded recently by various countries of the Communist *bloc*. Rumania, for instance is to supply oil products to Finland and Norway, and is to receive ferrous alloys from the latter, in exchange. Poland is to receive phosphates from Morocco, under the terms of an agreement whereby the value of exchanges between those countries over the next two years is to be increased to 3,600,000,000 Moroccan francs, as compared with 1,500,000,000 over the past two years. Poland is to exchange industrial equipment, including a rolling mill, coke and chemicals with Albania for chromium, copper and asphalt, which Albania will also export to East Germany.

Bulgaria will export to the Soviet Union non-ferrous metal ore and concentrates and barytes, in exchange for ferrous and non-ferrous metals, oil products and equipment for large-scale expansion of her iron and steel industry; to Poland, zinc and lead concentrates and block lead, in exchange for metallurgical coke: to Czechoslovakia, non-ferrous metals and concentrates, in exchange for plant necessary for open-cast mining and dressing of copper ore at a large new copper mine which is to be opened up; to the German Democratic Republic, non-ferrous metals and concentrates, in exchange for complete plants for various kinds of engineering production; to Yugoslavia, ores and concentrates, kaolin, fluorite and steel ingots, in exchange for rolled products, steel and cast iron tubes; and to the Benelux countries, foodstuffs, tobacco and cotton goods, in exchange for ferrous and non-ferrous metals.

Bauxite and alumina are reported to be among the main items in the trade agreement for the coming year signed between Hungary and East Germany. In return East Germany will supply Hungary with mainly machine plant and tools. Czechoslovakia is to receive tin, among various other primary products, from North Viet Nam, in exchange for complete mining and industrial plants, etc.

East Germany also is to receive tin from North Viet Nam, as well as chromium ore and zinc, in exchange for machinery.

PERCENTAGE DEPLETION ON URANIUM CONCENTRATES

Since publication of the article on "Depletion in Mine Taxation" (*The Mining Journal*, Dec. 11, 1959, pp. 602-604), we have received from the American Mining Congress a report which is of considerable interest in this connection. The chairman of the A.M.C. Tax Committee, Mr. Lincoln Arnold, together with members of the A.M.C. staff and representatives of the mining industry conferred recently with representatives of the Treasury Department and the Internal Revenue Service to discuss whether or not the concentrating of uranium ore into yellowcake should be allowed as an ordinary treatment process for the purpose of computing percentage depletion. As expected, the Government representatives did not indicate what their position was—and the result of the conference will not be known until the Government takes some action to affirm or reverse its previous position which allowed concentrating for depletion purposes.

In the course of the conference, A.M.C. presented a lengthy memorandum which pointed out that concentrating should be allowed because a process which the law names as being included in "mining" must be included in mining without regard to whether or not a "commercially marketable mineral product" has been obtained prior to the application of such process. Pointing out that this conclusion was compelled by the Statute itself and by the legislative history, A.M.C. said that any reversal of this interpretation could have possible application to many of the minerals included in section 613(c)(4) of the Internal Revenue Code. A.M.C. further urged that the milling of uranium ore into yellowcake is "concentrating" as that term is used in the depletion Statute and as it is understood in the mining industry, and that uranium ores properly belong in the class of ores which includes lead, zinc, gold, silver and copper.

The Mining Congress pointed out that the uranium producers had received written and oral assurances from the Government that concentrating was an allowable process for depletion purposes, and that tremendous commitments had been made on the basis of these assurances. Because of this, and because of the possible application to other minerals, A.M.C. said that even if a change in interpretation were justifiable as to the future, such a drastic change should be proposed only through an amendment of the regulations, with the usual notice of proposed rule making.

GEOCHEMICAL MAPS

New geochemical maps of a kind that are expected to be of great value in the search for promising base-metal areas were to be released by the Geological Survey of Canada on December 8. The first of their kind to be produced in Canada, the

four new maps cover the northern half of the Nova Scotia mainland, and are believed the first ever published of such a large area.

The information contained in the new maps was gained by making on-the-spot, ultra-sensitive chemical analyses of thousands of silt and sand samples. These were collected from nearly every stream in northern Nova Scotia and afterwards analyzed for lead, zinc and copper content in the Survey's Ottawa laboratories. The results were then plotted to make four geochemical maps — one each dealing with copper, lead, zinc and heavy metals. Each map consists of two sheets.

Prior announcement of their forthcoming release on December 8 was being made so that all prospectors and exploration companies might receive the information on the same date.

Dr. R. H. C. Holman of the Geological Survey of Canada headed a six-man party which collected the information necessary to compile the maps. The party examined over 3,000 samples of stream sediments during the field seasons of 1958 and 1959. The finished maps consist of two sheets each, and are printed in black and white on a scale of one-inch-to-four-miles, similar to that of the composite geological maps of Nova Scotia put out by the Geological Survey of Canada. The Geological Survey expects to continue the production of maps of this type. The first areas to be covered will probably be New Brunswick and northern Ontario, the latter to aid in the roads to resources programme.

SIBERIA'S MINERAL FUTURE

Detailed plans are announced, in a recent issue of the official Soviet metals bulletin Zwetniye Metalli, of the part Siberia is to play in the mineral expansion programme planned for the Soviet Union for the Seven Year Plan period 1959-65 and described on national lines in the *Mining Journal Annual Review* for 1959.

Some 44 per cent of all investment in the Russian metals industry during the Plan period is to be spent on Siberia. This is the main backing for plans under which production levels for the eastern republics of the Soviet Union will rise by 1965 by 88 per cent on 1959 levels for refined copper and by up to 71 per cent for aluminium. Particular stress is being laid on Siberian aluminium production. The Seven Year Plan provides for the erection of highly-modern bauxite mines, alumina plants and aluminium works near the new or under-construction power plants at Bruder, Irkutsk, Tomj-Usinski and Nazarovski. A call has been issued from Communist Party headquarters to the Siberian industry to " solve all problems connected with the production of aluminium from nephelite before the end of the Seven Year period."

Including plants for all types of metals to be produced in the area, a total of 29 new metals combines and works is planned for the period, work on all of them to have started by 1965 and most of them to have been completed by that year.

One of the most important single schemes in Siberia is the Norisysk Metals Combine. During the Plan a complete complex of modern mines and processing plants will be set up here, and present output of ore raised considerably, amount of finished and semi-finished metals produced increased and wastage cut to a minimum. Concentrates are to be smelted electrically at this combine and modern dust-destruction plant installed.

Improvement of Siberian gold production is also provided for. The new Mamansk hydro-electric power station will supply the Lenseloto Combine with cheap electric energy in the future, as a result of which production methods will be changed in the Lena goldfields. The uneconomic underground mining of gold will be superseded and a well process be introduced involving modern washing methods and the use of powerful, deep dragnets. Mechanisation of the fields and increases in productivity are the target for the Lena reorganisation plans.

NEW CHALLENGE TO THE OPEN HEARTH

Nearly three-quarters of a century have elapsed since the open hearth convector became the popular instrument for the mass production of steel. It still retains its supremacy. The steel industries of the U.S., Soviet Russia and the U.K., which collectively provide about two-thirds of the world's total ingot output, predominantly use the open hearth process.

But this method has never been free from assault. It is significant that the bulk of the output in Western Europe consists of Thomas steel, a refinement of the old Bessemer process. The two methods may be said to have achieved a state of peaceful co-existence. Thomas steel is cheaper to produce: the open hearth system claims a superiority in quality which is now less sharply defined.

To say this is not to suggest that steelmaking can ever become an occupation for the complacent. In the pursuit of higher efficiency, new techniques are being consistently explored. One of the most decisive changes in recent years has been the growing use of oxygen in bulk. It has been proved that a sinter plant for the full preparation of iron ore can increase the output from a blast furnace by as much as 60 per cent and although the capital cost of the more elaborate equipment is heavy it is more than offset by the greatly increased output.

In steelmaking the value of oxygen blowing has been no less convincingly demonstrated. By speeding up the reaction it has substantially reduced the capital cost per ton of output and at Appleby Frodingham the newly developed Ajax process has enabled the output per furnace to be pushed up by about 50 per cent compared with that of a steel furnace of the same hearth size without the use of oxygen.

Now a new rival has appeared. Originated and developed in Austria, the L.D. process based upon the top blowing of oxygen in the steel convector is making rapid strides. This process, which involves the use of 99 per cent pure oxygen, is claimed to be cheaper than any other method of steelmaking. Both capital and operating costs are said to be considerably lower than those of any other method of steel manufacture.

At all events Richard Thomas & Baldwin's plans for a new " greenfield " works at Newport, Mon. embrace the erection of a new melting shop based on the L.D. process and Colvilles, the Scottish steel giants, have included similar provision in their vast development project at Ravenscraig. The expectation that other British steel firms will be emboldened to follow this lead is embodied in the new agreement between the British Wellman Smith Owen Engineering Corporation and Voest A.G. of Austria for active co-operation in the design, supply and erection of further plant and equipment for L.D. steelmaking in this country. The impression exists that L.D. has come to stay and, indeed, is apparently confirmed by the pronouncement of the Iron and Steel Board that the new oxygen processes will develop more rapidly.

Owing to the Christmas Holidays, the next issue of " The Mining Journal " will be published two days in advance, on December 23.

Tungsten in Canada

AN important tungsten discovery has been made on the border of the Yukon and the Northwest Territories in the Mackenzie Mountains, 150 miles north of Watson Lake which is an important airport on the Alaska Highway. A new company called the Canada Tungsten Mining Corporation has been formed to work the property. Of its 2,000,000 issued shares Leitch Gold Mines, Highland-Bell, Area Mines, Dome Mines and Ventures each hold 14.52 per cent, the remaining 96,832 shares being held by Lake Expanse Mines.

Mr. Karl J. Springer, who headed the McKenzie Syndicate responsible for this discovery, is quoted by *The Northern Miner* as stating that the occurrence is probably the largest and richest tungsten deposit on the American Continent, if not the Free World. It is regarded in Canadian mining circles as " the find of the year ".

Limited drilling is reported to have indicated over 1,166,000 tons of open pit ore grading 2.18 per cent. WO_3. A $5,000,000 programme is planned by the new company, which aims to have a 300-ton mill in operation by the autumn of 1961. There is sufficient ore in sight to supply such a plant for 10-12 years. The mine lies on the slope of a mountain, about 1,200 ft. above the valley floor. It is planned to bring ore to the mill site in the valley either by a short aerial tram or by truck. A landing strip is being prepared in the valley. The mill will operate throughout the year, but mining will not be attempted in winter, the intention being to stockpile ore.

An Interesting Survey

This important development enhances the interest of *Tungsten Deposits of Canada*, a survey by H. W. Little. which is among the latest publications of the Geological Survey of Canada, Department of Mines and Technical Surveys, Ottawa (Price $1.50).

Hitherto tungsten ores in Canada have been mined, with minor exceptions, only under the stimulus of wartime production, or of stockpiling in the event of hostilities that might cut off normal sources of supply. During World War I, and more particularly during World War II, the increased demand for tungsten stimulated prospecting for this metal, and numerous new discoveries were made. During the latter war many offices of the Geological Survey of Canada, the Mines Branch, and some of the Provincial Departments of Mines were employed in the examination of promising deposits. Except for those in British Columbia, few reports on these properties have been published.

In the Yukon Territory there has been a small production of tungsten concentrates as a by-product of placer gold mining, writes H. S. Bostock, amounting in all to some 23,300 lb. valued at $15,700. Tungsten minerals are of widespread occurrence in the southern and central part of the territory in both placer and lode deposits. Reports of their occurrence include many small or little known discoveries of scheelite and ferberite or wolframite. The main occurrences to date, with the exceptions of Canadian Creek and the Fiddler group, are in the Mayo Mining Division. Here the deposits are commonly associated with small granitic intrusions distributed along a belt some hundreds of miles long which extends southeastward into little explored country. (Mr. Springer is reported to have been attracted by numerous intrusives as well as by the evidence of mineralization along a favourable arc-like belt extending for several hundred miles.)

In those parts of the belt where glaciation was light or absent, the gold placer creeks, with a few exceptions, have their headwaters around the granitic stocks of this belt, and scheelite and cassiterite occur with the gold. It is thought that the same association would have been found in gold placer creeks around the intrusions in the southeastward extension of the belt were it not that glaciation was much more intense in that region and the placers generally were destroyed. The lode sources may be there, however, and Bostock regards the southeastward extension of the belt as most promising for the occurrence of mineral deposits including those of tungsten. Indeed, a tungsten deposit was found there in 1952 by J. O. Wheeler of the Geological Survey, and prospectors have reported a number of other scheelite discoveries from around granitic stocks in the same region.

In the concentrates from the placer deposits the scheelite, since it crushes readily, appears as a fine, heavy, light grey or cream-coloured sand. The ferberite and wolframite form a dark brown to black, non-magnetic sand of generally coarser grains that show a good cleavage when the material is well crystallized. Some of the ferberite grains and pebbles, however, are formed of aggregates of extremely finely crystalline material that shows no sign of cleavage under the hand lens.

The lode deposits consist of pegmatite dykes, quartz veins, and disseminations in schist and altered limestone, often referred to as skarn. Scheelite is the most commonly recognized tunsten mineral in all three types of lode deposit in the Mayo Mining Division. Ferberite or wolframite is present as the main tungsten mineral at Canadian Creek, where it occurs widely disseminated in a pegmatite and porphyritic granitic complex, and also in the Fiddler group, where it is found in veins and in a prospect reported near Canadian Creek.

Up to the present, the gold placer deposits of central Yukon Territory have received all the attention of prospectors and miners. The presence of large quantities of other heavy minerals caught with the gold in the sluice box suggests that placer deposits of other heavy minerals including those of tungsten occur. However, the tungsten production has come from concentrates recovered incidentally in gold mining and it is mainly due to the search for and mining of gold that the presence of the tungsten and other valuable minerals is known. No endeavour to search for placers carrying such metals as tungsten as the main ore metal has been made, except in a very minor exploratory way by the Geological Survey.

The gold placer deposits carrying tungsten occur in a number of creeks. During the two wars, when tungsten shortage threatened, the presence of the tungsten in the placers stimulated the search for lode sources in the hills around them and many lode tungsten discoveries have resulted, though none has reached the mining stage except the Fiddler group, owned by Consolidated Mining and Smelting, which is situated four miles north of the Alaska Highway, 105 miles east of Teslin.

The known tungsten occurrences of Northwest Territories are confined to the Yellowknife Mining Division of the District of Mackenzie, from which more than a thousand tungsten-bearing veins have been reported. Only a few of

these are known to contain sufficient scheelite to be of economic interest. The report points out, however, that tungsten minerals probably occur in other parts of the Territories, for up to the present prospecting activity has been largely concentrated in Yellowknife Mining Division.

Deposits in Quartz Veins

Apart from disseminated scheelite in granite and basic dykes at Upper Ross Lake, all tungsten deposits are quartz veins, in many of which feldspar or tourmaline, and small amounts of sulphides and gold, occur. With the exception of the deposits on Outpost Islands (Tungsten Corporation of Canada Ltd.), in which ferberite predominates, scheelite is the only tungsten-bearing mineral reported in the veins.

The tungsten production of Northwest Territories up to the end of 1951 was 140,910 lb. of concentrate, valued at $37,764. This was produced during 1941-1943, and came almost entirely from the gold-copper-tungsten property on Outpost Islands.

According to the data at present available, only a few properties in the Northwest Territories could produce tungsten concentrate alone at a profit, and the quantity would be relatively small.

About 90 per cent of the recorded production of tungsten concentrates in Canada up to the end of 1952 had been derived from British Columbia. The major producers of tungsten concentrates in this province are Canadian Exploration Ltd., hitherto the Dominion's sole producer, who operate the Emerald, Feeney and Dodger orebodies ; and Western Tungsten Copper Mines, Ltd., who operate the Red Rose mine. Minor production has been derived from a few vein deposits, and from placers.

Scheelite is the only tungsten mineral reported in Saskatchewan and Manitoba. No recorded shipments of tungsten ore have been made from Saskatchewan, but Manitoba has shipped 1,592 lb. of tungsten concentrate, valued at $1,358. In Ontario Province tungsten minerals are found in the Precambrian rocks of the Canadian Shield. Scheelite production has been relatively small, except for Hollinger mine, which in 1940-43 and 1952 produced concentrate containing more than 200 tons of WO_3.

A small quantity of scheelite concentrate has been obtained in Quebec Province as a by-product of gold mining. Before 1919, Nova Scotia and New Brunswick may have produced fairly large amounts of tungsten ore and concentrate, but no records of early production have been kept. Since then Nova Scotia, in 1940 and 1942-43, has produced tungsten concentrate amounting to 32,260 lb. valued at $27,757.

Expansion Projects in Eastern Europe

REPORTS from various Eastern European sources, of which the following are among the most recent, serve to underline the magnitude of the effort currently being devoted by most Communist countries to the expansion of metal production.

With a chronic shortage of aluminium from Polish sources for the home market, an announcement has now been made that the Russian-built aluminium plant at Skawina in Poland is under the present Seven Year Plan to be so extended as to give it a capacity by the end of the Plan period of double the initial level. Further, within the seven-year programme provision is made for the erection of a second aluminium plant on the Skawina site. Present production at Skawina is 25,000 tonnes annually.

Also in Poland, the sulphur combine at Tarnobrzeg is undergoing extensions to enable it to handle the large quantities of mineable sulphur in the neighbourhood. Completion of the extensions will result in a covering of home demand and the entry of Poland into the international export market for sulphur.

After recently announcing (*Mining Journal*, November 6) the discovery of important new bauxite deposits in Hungary, the Government of that country now makes known the latest statistical details of the Hungarian bauxite industry. Over last year, it is stated, a total of 1,052,600 tonnes of bauxite was produced in Hungary, as against output for the previous year of only 917,000 tonnes. Of the 1958 production, approximately a half — 518,276 tonnes — was exported, three-fifths of the exported amount going to Czechoslovakia and almost all the rest to East Germany. The disappearance of the Soviet Union from the list of customers — once it was the main buyer of Hungarian bauxite — is due to its growing use of nephelite as a base for aluminium.

Alumina production in Hungary last year reached the record level of 177,000 (1957: 154,000) tonnes. Finished aluminium rose considerably, from a 1957 total of 26,000 tonnes to a level last year of 40,000 tonnes. Over 50 per cent of this had to be exported owing to the inadequacy of Hungarian aluminium-working plants. With Russian help, the country's big aluminium works at Székesfehérvár is being expanded to such an extent that future production will be as much as 400 per cent of present levels. A further raise of annual production of 3,000 tonnes, which will be experienced in the current year will result from the installation of a new furnace at the Tatabanya plant.

Latest reports from East Berlin indicate that the attempts of the East German Government to build up production of precious and rare metals are by no means losing in their keenness. Targets now set for the East German metals industry include the raising by 1965 of silver production to 172 per cent of present level, that of selenium to almost 250 per cent of present production and that of rhenium to 200 per cent of the present level. A step in this direction is the recent bringing into operation of the VEB Spurenmetalle plant (*Mining Journal*, September 11), with a production programme covering germanium, as well as indium and silicon.

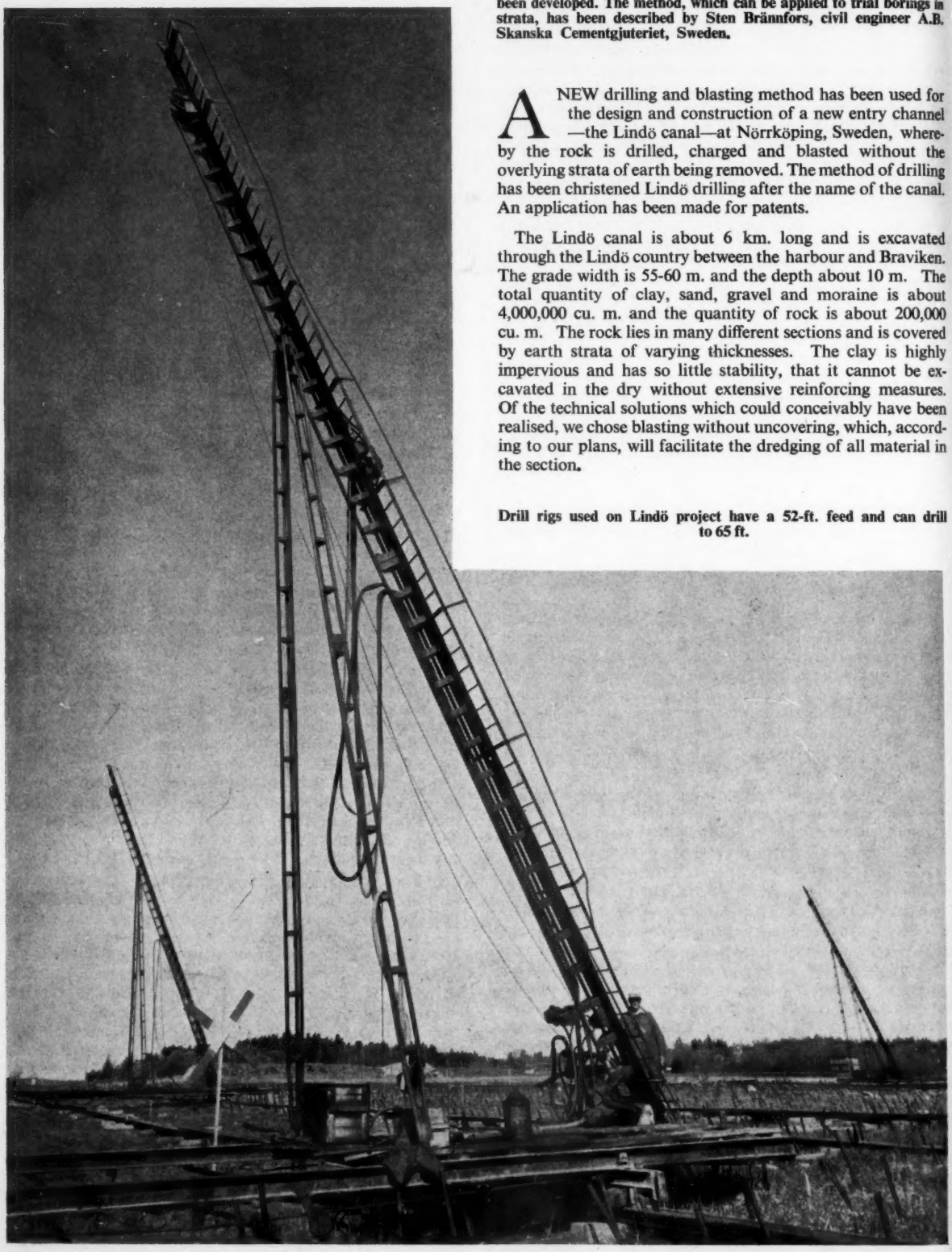
In a map recently issued by the propaganda organs of the East German Government to show the industrialization projects on hand in the Republic, various mineral-mining and processing projects are marked. Apart from the extension to the copper plant and the continuation of construction of a nickel smelting works at St. Egidien, near Chemnitz, details of which have already been given by *Mining Journal*, the following new schemes are mentioned ; opening of new opencast lignite mining sites at Phonix-Nord, Schleenhain and Haselbach near Leipzig, at Nochten, Burghammer, Bluno, Welzow, Meuro, Seese and Schlabendorf in the extensive Cottbus lignite fields, and at Amsdorf and Golpa in the Halle-on-Saale area; the extension of an existing opencast lignite mine near Spreetal in the Cottbus fields ; the continued construction of briquetting works for lignite at Sonne in the Cottbus fields; the extension of two similar plants at Grosszossen and Regis near Leipzig; and the extension of potash mines at Merkers, on the border with West Germany, and Sondershausen, near Erfurt.

Drilling and Blasting Without Uncovering

A complicated excavation and blasting operation is being carried out for the Harbour Administration in Nörrkoping. In order to solve the technical problems involved, a new drilling and blasting method has been developed. The method, which can be applied to trial borings in strata, has been described by Sten Brännfors, civil engineer A.B. Skanska Cementgjuteriet, Sweden.

A NEW drilling and blasting method has been used for the design and construction of a new entry channel —the Lindö canal—at Nörrköping, Sweden, whereby the rock is drilled, charged and blasted without the overlying strata of earth being removed. The method of drilling has been christened Lindö drilling after the name of the canal. An application has been made for patents.

The Lindö canal is about 6 km. long and is excavated through the Lindö country between the harbour and Braviken. The grade width is 55-60 m. and the depth about 10 m. The total quantity of clay, sand, gravel and moraine is about 4,000,000 cu. m. and the quantity of rock is about 200,000 cu. m. The rock lies in many different sections and is covered by earth strata of varying thicknesses. The clay is highly impervious and has so little stability, that it cannot be excavated in the dry without extensive reinforcing measures. Of the technical solutions which could conceivably have been realised, we chose blasting without uncovering, which, according to our plans, will facilitate the dredging of all material in the section.



Drill rigs used on Lindö project have a 52-ft. feed and can drill to 65 ft.

Above, the blast. Below, at right, inserting a dynamite cartridge in the breach of the compressed air loader.

Special drilling towers have been built for the drilling, with 16 m. length of feed. The drilling machine equipment is a modification of drilling machine BBC 43, whose ordinary rotating mechanism is put out of action and replaced by a special rotating motor with substantially greater turning moment than the standard equipment. By special arrangements, both stroke and rotation are transmitted partly to a drill pipe and partly to a 1¼ in. drill rod, which runs in the hole. The drill pipe is provided at its lower end with a circular drilling crown with hardmetal cutters and the drill rod with a 4-cutter hardmetal crown.

The drill pipe and the drill rod bore down simultaneously through the earth material under powerful water flushing, until the drill pipe crown has bored some dm. into the rock and attains proper contact with firm rock. The drill pipe is then uncoupled from the drilling operation and the borehole in the rock is drilled with drill rod and cutter in the usual manner, whereafter the drill rod is drawn up. The drill pipe now forms the tight connection between the borehole and the ground surface, which is required for the borehole to be charged. The drill pipe is, however, too costly to be destroyed in the explosion and is therefore replaced by a plastic tube, which is pushed down inside the drill pipe and is attached to the borehole wall by single external packing. The plastic tube then forms the sealed connection between borehole and ground level, which is required for the charge, and the drill pipe can be drawn up and used for the next hole.

After cleaning of the borehole by blowing and flushing, charging is done from ground level by means of a charging apparatus consisting of plastic tube, which is the result of experimentation for this work. Blasting takes place at short intervals in line in the usual manner. Charging and blasting problems have been worked out jointly with the Nitro-glycerine Company's experts.

The largest salvo so far fired contained 15 tons of explosive distributed among 800 boreholes, and 2,250 fuses. We have a capacity of about 15 holes per machine shift with the large drilling tower in Lindö. The average depth of hole is 12 m., of which 2 m. is rock, 2 m. is moraine and 7 m. is clay. The maximum output obtained is 28 holes per shift.

Work on the canal is so far advanced, that all the rock and all the hard moraine have now been drilled. To control the spoil each salvo is dredged. Dredging has been satisfactory. The rock and the hard moraine are blasted as the dredging goes forward and as close to the dredging as possible.

The drilling method has already found other fields of application. Trial borings, where required to be made through earth strata to determine the position of the rock, are one field where it is very competitive. With increased pipe dimensions, sampling of earth material can be done because the sampling equipment can be manoeuvred inside the pipe. Relatively high mobility can be obtained with equipment mounted on a rubber-tyred transport platform wagon.

With existing equipment drill pipes can be drilled down to about 20 m. deep in difficult boulder moraine. With more powerful machine equipment this depth can, of course, be increased. The method has also been used for anchoring piles in sloping rock, where the use is made of ability of the circular drilling crown to find a cutting grip on sloping rock surfaces. Lindö drilling has also been used for certain reinforcing works, where the ability of the drilling equipment to bore through gravel boulder, timber and other obstacles has facilitated economic solutions.

Indian Market for

ACCORDING to a report prepared by the United Kingdom Trade Commissioner at Calcutta for the Export Services Branch of the Board of Trade, Indian demand for coal mining machinery is likely to remain high. Although the original scale of the Second Five-Year Plan, now in its fourth year, has been reduced because of the shortage of foreign exchange, production targets for coal, which is of vital importance to industrial expansion, remain near the original level. The shortage of foreign exchange is, however, currently limiting purchases of foreign equipment and U.K. exporters may find opportunities limited by the existence of credits tied to purchases by India from other countries. On the other hand, the Indian Government appears reluctant to authorize purchases of equipment under these special arrangements where prices are substantially above those quoted by traditional suppliers.

The import requirements of the Indian coal mining industry will also be modified by the setting up during the next two or three years of a government-owned mining machinery and equipment plant with an output of 30,000 tons per annum. The principal items intended for manufacture at this plant are coal cutters, coal loaders, conveyors and conveyor drives, winders, haulages, mining locomotives, winches, mine pumps and fans. Having its own small foundry and forge for light castings and forgings, the plant is estimated to cost about Rs. 13 crores, excluding working capital and cost of township, etc., and will be designed, built and financed by the U.S.S.R. It will, however, be some time before the plant is in production and its impact should not be felt until the latter half of the Third Five-Year Plan.

India's coal mining industry consists of 1,114 mines of which an average of 825 are at work in any one month. In 1958, the Private and Public Sectors of the industry produced 39,500,000 and 5,750,000 tons respectively. All new undertakings will be the responsibility of the Public Sector in the future while in the Private Sector activity will be limited to the expansion of existing mines. The Plan target for 1960/61 was set at 60,000,000 tons, an increase of 22,000,000 tons over production at the beginning of the period. Of this increase 12,000,000 tons were expected from the Public Sector and 10,000,000 tons from the Private Sector. 6,000,000 tons was to come from opencast mining and 16,000,000 tons from underground. Actual production in 1960/61 will be in the region of 45,000,000 tons from the Private Sector and 13,000,000 tons in the Public Sector.

Much of the work done by the National Coal Development Corporation (i.e., the Public Sector) during the early years of the current Plan has been of a preparatory character such as prospecting, project reports and placing orders for equipment.

The degree of mechanization in Indian mines is so far small compared with European standards, but it is increasing. Most of the mechanical equipment is at the coal face. Output per man shift is about one-fifth that of many advanced countries.

It is, however, the long-term policy of the National Coal Development Corporation fully to mechanize the mines in the Public Sector. To date, the Public Sector has spent Rs. 7 crores on imported mining machinery. Expenditure of foreign exchange required during the remainder of the Second Five-Year Plan has been estimated at Rs. 15 crores, exclusive of the cost of spares and other items of maintenance. Rs. 1.6 crores of foreign exchange have been allocated to the Public Sector Singareni collieries for mining machinery.

The U.K. Trade Commissioner has drawn up a list of estimated requirements, for one new underground mine, of plant and equipment which cannot at present be obtained from Indian manufacturers. Based on mining by inclines, the list includes equipment for coal cutting and drilling, coal handling and screening, communications and lighting, pumping, ventilation and electricity supply. For shaft mining, electric winding gears, headgears and winding ropes would also be required.

It has been estimated that equipping a mine in this way would produce an annual output of 250,000 tons and this list would have to be multiplied by 64 to meet the output target increase under the Second Five-Year Plan and by 128 to meet that for the Third Five-Year Plan, plus perhaps 50 per cent for spares and replacement of existing plant. Such a picture must, however, be viewed in the light of the new domestic production in future years and of the fact that a substantial part of the order under the Second Five-Year Plan has already been placed.

For that part of the Second Five-Year Plan that still remains (between one and two years), the Coal Controller has estimated the needs of the Private Sector for mining machinery and this also is listed in the report.

At present, no flame-proof equipment is manufactured in India, but steps are being taken to test electrical equipment at the newly established Mining Research Institute at Dhanbad and eventually gate-end boxes, transformers and switchgear for underground use will be made in India. Motors up to 100 h.p. for industrial use and various types of switchgear and transformers are already being made there.

The Indian Bureau of Mines, which undertakes prospecting and drilling for government and semi-government organisations, uses only rotary drills and has 85 rigs for core drilling, 40 of which are truck-mounted and 25 of U.S.S.R. manufacture. It is understood that the Bureau is unlikely to require any more drilling rigs for the next few years. The N.C.D.C. has some percussion drilling rigs but not all are in use. As it develops its own prospecting it may take over some rigs from the Indian Bureau of Mines. All drills for underground mining are at present imported. Drill bits are made by Kilburn & Co. of Calcutta, in collaboration with a U.K. firm, Voltas Ltd., who already make tungsten carbide drills, are shortly to manufacture diamond tipped drills for underground prospecting. Several firms are beginning to make compressors.

The future demand for coal-cutting machines is expected to be very large, 464 being in use on average during January/June 1958. Local production is projected by Meameco Private Ltd., Dhanbad, who have been granted permission to manufacture 24 coal cutters annually in collaboration with Koefmann, of Germany.

A number of firms, including Kilburn and Company, Calcutta, and Meameco Private Ltd., Dhanbad, Bihar, are already manufacturing haulages in India, some with help from U.K. firms. Some of the big coal mining organisations such as Andrew Yule and Co. Ltd., make their own. Less than 50 per cent of Indian mines have

Coal Mining Machinery

any mechanical haulage equipment and, with the introduction of conveying equipment, further demand is not likely to be substantial.

There is an acute shortage of steel wire ropes in India at the present time. Four firms are licensed to manufacture up to a total capacity of 8,000 tons per annum, but the Indian Government had declared that there is scope for at least another 3,000 tons capacity and because of the shortage of suitable steel only a small portion of the present licensed capacity is productive. The four firms manufacturing steel wire ropes, or licensed to manufacture, are the National Rolling and Steel Rope Company and J. K. Steels Limited, both of Calcutta ; Indian Steel and Wire Products Ltd., of Tatanagar ; and Best Cotton Co., of Bombay.

Nearly all the mechanical conveyors in use in India have been supplied by the U.K. The assembly and partial manufacture of conveyors are to be undertaken by both Martin Burn Ltd. and MacNeill and Barry. Certain mines, e.g., Singareni mines, already fabricate the structural side of the equipment, importing only the rollers. A number of firms in Bombay and Meameco in Dhanbad also manufacture gravity roller, chain bucket and belt and chain conveyors. Indigenous production is developing rapidly and probably caters for the bulk of the requirements of the country for the simpler types of these conveyors. In the period January/June 1958, an average of 64 conveyors were in operation each month in the Indian coal mines.

Only five mechanical loaders are in constant use in one mine in Andhra Pradesh, but the demand for these loaders will no doubt increase from the larger mines run by the National Coal Development Corporation.

Mine fans in use in India are generally of the centrifugal type but several large capacity propeller fans circulating up to 400,000 cu. ft. of air per minute are being installed. At many of the smaller mines no fans are installed, ventilation being either natural or induced by a steam jet. Most of the mechanical ventilators are in mines in Bihar and West Bengal. Keymer Bagshaw and Company Limited make ventilation equipment and ducts approved by the Indian Mining Inspectorate. The fans have a maximum capacity of 20,000 cu. ft. of air per minute and have proved acceptable to both the Private and Public Sectors. The firm claims to be able to meet most of the requirements of the mining industry in India, but the U.S.S.R. recently secured an order for 12 mine booster fans at Rs. 4,200 each c.i.f. against payment in non-convertible rupees. The method of payment precluded consideration of any other foreign offers.

In respect of lighting, battery-operated lamps manufactured in India under a well-known U.K. name are said to have a monopoly of the demand from coal mines and the output of this firm is considered sufficient to meet the reasonably foreseeable demands of the coal mining industry. Safety flame lamps, however, are not manufactured in India and the Indian Mining Inspectorate has recommended that the use of these be extended. It is understood that such lamps of U.K. manufacture have not so far been approved by the Inspectorate and there may be openings for the sale of British lamps, though some competition may be experienced from Polish manufacturers who are prepared to offer equipment for payment in rupees.

Though India has been self-sufficient in coal mine belting, the requirement by the Inspectorate that flame resistant PVC belting be used in dangerous conditions, following the Chinakuri mine disaster, has complicated the position. Dunlop and Goodyear have begun to make PVC belting, but an estimate of how far the requirements of Indian mines will be met by local production cannot be made.

A considerable percentage of the additionally won coal under the Second and Third Five-Year Plans will come from opencast pits and the Commissioner has drawn up a list of equipment needed for producing one million tons of coal per annum from this source. Some of the equipment is manufactured or assembled indigenously, e.g., road rollers and jeeps, but much will need to be imported and practically all the machines in use at present will have to be replaced during the course of the Third Five-Year Plan. Much heavier equipment than that listed may ultimately be used ; e.g., draglines of 8 to 15 cu. yds. capacity may take the place of the smaller shovels, and shovels up to 8 cu. yds. capacity may replace those of 4½ cu. yds. A great deal of equipment will be required for repair workshops and much of this will have to be imported.

Business with India is best done through an agent and some U.K. firms have their own representatives in the field, many of whom still have stocks to meet smaller demands, despite the restrictive times. Business now is usually between the user and manufacturer and the agent will secure the order on a commission basis ; the mine itself obtaining the necessary import licence. An agent needs to have good contacts with buyers in the Private Sector and to secure the confidence of the National Coal Development Corporation at Ranchi, where it is probably better for a Calcutta-based agent to maintain a resident representative.

In the Private Sector, each company or managing agent maintains its stores purchase section and, in general, this section knows which agent is able to meet its requirements. Where, however, the equipment specified is of a general nature, the stores purchase section puts out its inquiry to all the local agents of U.K. and foreign firms able to supply. There is, nevertheless, a preference for U.K. equipment.

The National Coal Development Corporation for the Public Sector is prepared to place small orders direct with agents of foreign manufacturers. Any order likely to be worth over Rs. 10,000 must, however, be the subject of a call for tenders. The U.K. Trade Commission in Calcutta reports calls for tenders of interest to U.K. manufacturers to the Export Service Branch, from whom a list of likely purchasers of coal mining machinery is also obtainable. Advertising plays a relatively small part in the business done by Indian agents, with the exception of earth-moving machinery, which is more widely advertised.

Servicing is a most important facility to be offered by the Indian agent, most of whom maintain qualified engineers and operators in the field, offering advice and providing after-sales maintenance.

A summary of import licensing regulation and customs duties is included in the report, as well as a summary of current and possible future activities within the various Indian coalfields.

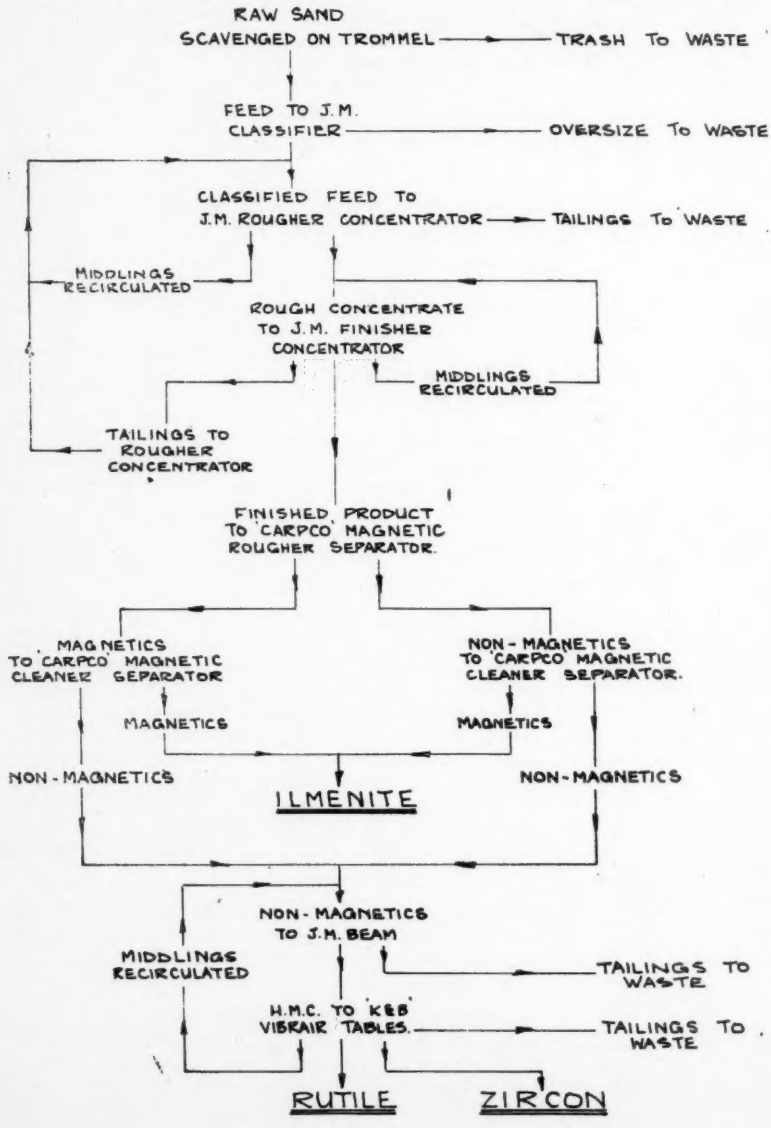
Machinery and Equipment

A Dry Concentration Technique

A dry concentration system designed specifically for the treatment of sands was demonstrated recently to the Technical Press by Knapp and Bates Ltd., in association with J. R. F. Joyce Ltd. The demonstration was prepared to show how large tonnages of relatively poor sands can be readily and conveniently treated when only sun dried and how the bulk concentrate produced can then be efficiently separated into its different constituents without any other heat treatment. The technique is claimed as a new approach applicable to arid and semi-arid regions. The possibility exists that the system might be used firstly for prospecting, and secondly on a production basis for storm beach dunes and actual beach sands after sun drying.

The first stages of concentration are carried out on the Joyce-Martienssen concentrator, the essential principle of which is that dry granular material flowing at an even velocity down an inclined trough tends to stratify itself. Thus the heavier particles collect nearest the surface of the trough while the lighter particles ride as an upper layer or layers. At intervals the trough is pierced with a pattern of holes of such shape and aperture that heavier particles tend to pass through, while the lighter and upper section of the bed are supported and pass the apertures.

The sixfold beam used in the demonstration treats the feed 36 times in a single pass; it is employed in the first pass as a classifier-rougher and on the second as a finisher. Tailings from the first stage are discarded while those from the finisher stage are returned to the first stage. In a rougher concentrator such as this there is inevitably some entrainment of barren material, but concentration ratios of the order of as high as 50:1 can be attained.



While the system can naturally be installed at a wide range of output tonnages from the portable equipment to the large throughput installation, statistics revealing weight in relation to output are of interest. The Joyce-Martienssen beam has a nominal capacity of 1 ton per hr. and weighs 80 lb. fabricated in light alloy extrusions. The elevator with rising main vacuum pipe and upper separator chamber is just short of 100 lb. The aspirator used in the demonstration weighed 44 lb. This, of course, was an electrically driven machine and anything of this type used in the field would probably have to be driven from the power take-off of a Land Rover or could be driven by a d.c. motor if the Land Rover were provided with a big extra battery.

To these weights it is necessary to add some structure to support the beam at the working angle which varies between 30 and 44 deg. according to the type of ground being treated and one could add, if necessary, a little trommel screen which would weigh about 2¼ cwt. to remove debris. The length would overlap the Land Rover's body, but the whole outfit with a small crew could be carried in one vehicle.

Elevation of middlings is accomplished in the Joyce-Scott vacuum elevator. This device has the advantage that no working parts except the face of the discharge valve are exposed to the abrasive action of the particles. It is, like the Joyce-Martienssen beam, light, robust and readily portable. The elevators used on the beam have a rated capacity of 1,500 lb./hr. to a height of 22 ft. with the expenditure of only ¼ h.p.

The product from the finisher concentration is next treated to remove a strongly magnetic concentrate of ilmenite which has a TiO_2 content of 52 - 54 per cent. This stage in the demonstration was done on a Carpco induced-roll laboratory magnetic separator. The magnetic fraction is finished ilmenite of a purity acceptable to manufacturers.

The non-magnetic fraction should then be treated on a second Joyce-Martienssen beam to reduce the barren quartz content thus producing a concentrate containing the remaining heavy minerals. This second concentrate would be subjected to a further stage of magnetic separation which would remove as a concentrate the remaining less strongly magnetic ilmenite, and magnetic rutile.

A further pass on a Joyce-Martienssen beam then up-grades the final concentrate for treatment on the Knapp and Bates Vibrair table, on which zircon is separated from rutile. This separation between two materials of almost equal density thus takes place by virtue of the shape difference in the particles. On production scale work the middling produced at this stage would be subjected to further treatment on another table with different adjustments to air flow.

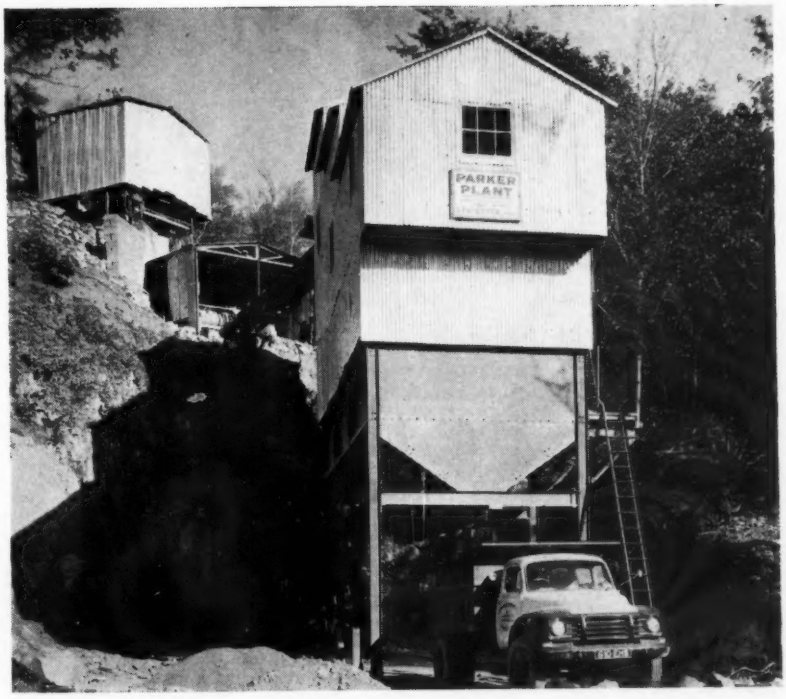
NEW QUARRYING COMPANY

A new company founded in May of this year to quarry a magnesium limestone deposit at Coleford, Gloucestershire, for use in the road-making industry and as a mineral for agriculture, is now well established.

Stowfield Quarries Ltd.'s new plant

The company — Stowfield Quarries Ltd.—was founded six months ago. The operational site has been cleared and overburden removed. A Parker crushing, screening and storage plant with an output of 300 tons a day together with a weighbridge has been installed.

After primary crushing in a 25 in. x 14 in. crusher, the material passes into a new plant made by Frederick Parker Ltd. This consists of a 36 in. x 6 in. Stonesizer granulator which has outputs of 33 to 36 tons an hour to minus 1½ in.; a 22-ft. Oscillex horizontal vibratory screen; and a 40 in. x 96 in. triple deck Niagara screen. The screened products (−¼ in., ⅜ in., ½ in., ¾ in., 1 in., ¼ in., 1¼ in., 2¼ in. and rejects) are stored in nine storage bins which have a total capacity of 195 tons. Electricity to drive the plant is generated on site.



TV SHOWS DRILLING RESULTS

A new closed circuit underwater TV camera has been developed in America by Layre and Bowler Pump Co., by means of which pictures of the characteristics of the walls and bottom of a drill hole may be shown on the screen. Less than 4 in. in dia. and 20 in. long and weighing only 12.5 lb., the new round camera carries its own lighting system. Two sets of lights are available, one using a small ring of lights behind the camera lens and the other using a single high intensity mercury vapour light ahead of the camera with a shield between it and the lens. The TV camera uses a standard 16 mm. lens.

The pictures taken down the drill hole are transmitted to a continuous monitor receiver at the collar of the hole and a permanent record of the hole can be obtained by photographing the picture received. Operational limits for normal equipment are 140 deg. F. and a pressure of 1,500 ft. of water, but the former can be overcome by insulation and refrigeration and the latter by building a special high-pressure unit.

EQUIPMENT DIGEST

The N.W. Division of the N.C.B. has placed an order with Heyes and Co. Ltd., for two 5 level type 40 shaft signalling indicator systems for installation with the two winders in No. 1 Shaft at the new Parkside Colliery, Newton-le-Willows, due for completion next spring. Each system consists of a fabricated steel floor mounting cabinet containing, in a dust-tight compartment, five level relay groups, each being arranged with destination holds and emergency stop facilities. The line relay is fitted with contacts for the operation of a signal recorder and the emergency stop relay is fitted with extra contacts for use in the winder safety circuit if required. The interlock reset relay and the bank level indicator relays are also mounted in the cabinet. Mounted in the right hand side of the cabinet and isolated from the relay cabinet, are a 12 v. Nife battery and automatic charger, with the display lamp transformer and mains fail relay.

The Wigan type 40 shaft signalling system has already been successfully installed at another of Britain's most modern pits, the new Agecroft Colliery, near Manchester. Similar equipment is in use at Pye Hill Colliery, Mosley Common Colliery, Askern Colliery, Kingsbury Colliery and Preston-links Colliery. Heyes and Co. Ltd., recently received an order from the Northern Division of the N.C.B., for a five level type 40 indicator set for installation at Choppington "B" Colliery next January.

★

Incorporating radical changes, a new off-road hauler is announced by LeTourneau-Westinghouse which is available as 27 and 32 ton end-dump models and an 80 ton bottom-dump model. In this new Haulpak four shock absorber type pistons take the place of springs; conventional axles have been eliminated; and there are no tie rods or exposed steering linkage, all the steering system being protected within or above the frame line to give the machine almost twice the front end ground clearance of conventional trucks. Power steering and power brakes are standard equipment.

Providing power for the 27-ton model is a Cummins 335 h.p. turbo-charged engine giving operating speeds of up to 35.4 m.p.h. The 32-ton model has a Cummins 375 h.p. turbo-charged engine giving speeds of up to 38.8 m.p.h., while the 80-ton model is powered by a Cummins V-12, 450 h.p. engine giving operating speeds of up to 40 m.p.h. All three have torque converters which provide four forward ranges and two reverse. A number of other refinements are also specified. The 80-ton bottom-dump model is designed for coal strip mining operations.

★

In the face of severe competition from the Continent, the Heavy Plant Division of Associated Electrical Industries has secured a contract from Norway for a 108,000 kW. rectifier installation required in connection with aluminium smelting. This rectifier equipment is believed to be the largest of its kind yet ordered. The contract has been placed by Ardal og Sunndal Verk, the equipment being for important extensions to their existing plant at Ardal — situated at the head of the Sognefjord on the west coast of Norway. A/S Ardal og Sunndal Verk are already the largest producers of aluminium in Norway and the new extensions represent an increase in production capacity of 32,000 tons per annum.

The order covers semi-conductor rectifier equipment rated at 135,000 amp., 800 volts d.c. and the plant is to be commissioned and in commercial operation early in 1962. The transformers required to operate with the rectifier equipment will be manufactured in Norway by A/S Rich Pfeiffer.

★

The U.S. Bureau of Mines have recently published an account of an investigation into the use of radiant heat to reduce the filter cake moisture in coal preparation and it was found that a marked reduction was obtained.

The maximum benefit was obtained when the heat was applied during the early part of the drying phase, rather than toward the end of the cycle, and it is clear that the reduction in moisture content is due to a combination lower fluid viscosity and evaporation. Maximum efficiency was obtained when all the flue gases from the heater were drawn through the filter cake.

A minus 48 mesh coal slurry resulted in producing a cake carrying 7.2 per cent moisture when heat was applied for 40 seconds (⅔ of the drying time in a 3-minute cycle) compared with 17.8 per cent with heat treament. The cost estimate is $0.83 per ton of water removed which is about a half the cost of removing water by conventional thermal drying.

MINING MISCELLANY

Tunnels at the iron ore mines near Manara, in Galilee, are being deepened. At present the iron is being mined for testing, but lack of adequate funds prevent final plans being taken regarding processing for enriching the ore.

★

Mr. Tan Siew Sin, Minister of Finance for Malaya, in his recent budget speech, announced that all diesel and other fuel oils would immediately be subject to a new import duty of 20 c. a gal. This is causing grave concern to the tin miners, who have protested strongly against the impost, which results in increasing production costs for dredge and gravel pump mines to such an extent that many mines, especially marginal ones, will be unable to operate. The Minister's statement is a blow, as in the Speech from the Throne earlier in the same day, it was stated that everything would be done to improve the competitive position of the tin and rubber industries on which the economy of Malaya so largely depends.

★

A copper smelter, the first in South-West Africa, is to be constructed in Tsumeb soon, and should be in operation in 1962. Mr. Charles E. Stott, general manager of Tsumeb Corporation Ltd., recently reported that, besides smelting concentrates produced by the Corporation's mines, the smelter would be equipped to treat copper-bearing ores and concentrates from other mines in the territory. He added that the possibility of smelting lead at Tsumeb was being considered, and the smelter was being designed so that this facility could be added at a later date.

★

Broken Hill Proprietary Co., is to establish an electro-metallurgical industry at Bell Bay, Tasmania, at a cost of £A1,660,000, and the plant should be in operation by 1962. The enterprise will be wholly owned by a subsidiary of Broken Hill Proprietary Co., known as Tasmanian Electro Metallurgical Co. Pty. Ltd. and its first objective will be the production of ferro-manganese. At present some of the country's ferro-alloy requirements are produced at Newcastle, and the balance is imported. The company hope later to manufacture other electrometallurgical products. The works will be adjacent to those of the Australian Aluminium Production Commission at Bell Bay, North Tasmania. The Bell Bay aluminium works is to increase its annual capacity by 4,000 tons of metal as a result of the State Government's decision to invest an additional £A1,500,000 in the enterprise and may increase output to 28,500 tons if a third partner shares the enterprise with the Commonwealth and State Governments.

★

A new concession for the mining of a lignite deposit at Addi Zarna, near Udi-Ugri, Eritrea, has been granted to Mr. Leo Venturi, who discovered the deposit. In the first weeks of operation, nearly a ton of good quality lignite was mined, and with the import of modern machinery, considerable development is foreseen. It is expected that lignite may obviate the necessity for coal imports

★

Italian miners' trade unions have announced the conclusion of negotiations on a new collective labour agreement with the mine-owners. The new three-year agreement provides for a minimum wage increase of 2.5 per cent and a reduction in normal working hours amounting to six working days per year. The agreement was reached under the auspices of the Labour Ministry after a series of general strikes in past weeks by miners.

★

The U.S. Department of the Interior have detailed three scientists and four engineers to participate in the current season's U.S. effort in the Antarctic. Their responsibilities will be to collect data for the preparation of topographic maps, conduct reconnaissance geological investigations and investigate methods and conditions of mineral exploration and development, as part of the total U.S. Antarctic programme that is co-ordinated by the National Science Foundation.

★

Prospecting for iron ore has begun in the new areas of West Pakistan at Kalabagh, reports the *Pakistan News*. Work has already been started on two new tunnels in the area to check on various strata of ore, as well as the volume and intensity of iron deposits. Good quality iron ore has also been found in Waziristan and geologists are surveying large areas to find out the volume of these deposits.

★

Preparations for building Algeria's first steel plant at Bone are reported to be well advanced, stated M. Debre, the French Premier, in Bone, where he had been officiating at the ceremonial inauguration of the first Sahara oil pipeline. There have been reports, however, that the project is behind schedule, the main problem being one of finance.

★

A Joint British Committee for Vacuum Science and Technology, 47 Belgrave Square, S.W.1, has recently been formed, consisting of representatives of ten British professional societies. Its objects are to arrange meetings on the subject in Britain and to ensure British participation in international meetings.

★

The Pignatari industrial group, a Brazilian concern with a combined capital of 2,200,000,000 cruzeiros, are embarking on a programme which includes expansion of their mining and metallurgical activities. Associate companies of the group, which will import equipment to improve installations, include the Companhia Brasileira de Cobre, which produces copper concentrates at its mines at Camaqua, Bahia and Seival, Rio Grande do Sul, reducing and refining the metal at Itapeva and Utinga, Sao Paulo. The average metallic content of the ore is 3.7 per cent when mined, and 38 per cent in concentrates. Refining capacity is to be raised from 300 to 1,300 tonnes monthly.

★

On October 30 last a company was formed in Uruguay for the exploitation of iron ore deposits at Valentines, in the department of Florida. The firm, Yacimientos Minerales de Valentines S.A., is stated to have an authorized capital of 50,000,000 pesos, with 5,000,000 pesos paid up. It is reported that the Banque de Paris et des Pays Bas will participate in the project.

★

Gelsenkirchener Bergwerks A.G., West Germany's biggest coal mining concern, has decided to close three of its pits to cut down surplus production. It is reported that these closures will take effect during the next two years, and will affect about 6,500 workers. The three pits, all in the Ruhr town of Bochum, with an annual production of 1,700,000 tons are all working at a loss. The Ruhr Mine Owners' Federation announced earlier this year that between 12 and 15 pits would have to be closed by 1960-61 to combat the West German crisis and keep the industry competitive. The Federal Government has promised help in setting up new industries in the area.

★

The Norwegian industrial concern Christiania Spigerverk has decided to exploit extended deposits of nepheline syenite in Stjernioy in northern Norway. The deposits have been investigated by diamond drilling, and samples treated in pilot plants have shown good results. A treatment plant with an annual capacity of 25,000 tons will be erected, with possible extensions at a later date.

★

Williams, Harvey and Co., of Liverpool, are reported to have granted a credit loan to the nationalized Bolivian mining concern Corporacion Minera de Bolivia. The loan is to be used for the purchase of machines and spare parts for the concern's mining sites.

★

In a statement made to West German enquirers last week, the deputy Foreign Minister of Ethiopia, Mr. Emmanuel Abraham, stated in Addis Ababa that Ethiopia was interested in exploiting her mineral reserves. The iron ore deposits to be found in the country had proved to be of very minor importance, he said, but German experts had proved in a recent survey that first-quality chrome ores were obtainable in quantities which would justify their commercial exploitation. Herr Alfried von Krupp und Bohlen, who recently visited Ethiopia, is said to be interested.

★

The discovery of a new vein of gold has been reported from Ethiopia's biggest goldfield at Adola. The working of this vein should raise the country's gold output, at present only 500 kgs. a year, at least to the level obtained during the Italian occupation of the country, which was 2,000 kgs. annually. It was estimated that foreign spending would be about 5,000,000 Ethiopian dollars.

★

The Ghana Report of the Mines Department on the mineral industry for the period April, 1958 to March 31, 1959, states that gold, diamonds, manganese and bauxite remain the only mineral exports, as in previous years. The total value of the mineral products during the period amounted to £G.26,926,287, made up as follows: gold bullion produced, £G.10,849,428 at 249s. per f.oz.; diamonds exported, £G.8,014,466; manganese ore exported, £G.7,688,356; Bauxite exported £G.374,037.

★

A trade agreement has been signed by representatives of East and West Germany, under which Western Germany is

to supply Eastern Germany with a range of mineral and other products in return for brown coal and other commodities. Main values from West to East, with 1959 export values in brackets, are given for 1960 as: phosphates: 30,000,000 (same) E.U.; foundry products, 10,000,000 (same) E.U.; iron and steel products 237,000,000 (219,000,000) E.U.; non-ferrous metals 10,000,000 (same) E.U.; and what are called simply "mined products" but which consist solely of hard coal from the Ruhr 35,000,000 (59,000,000) E.U.; Eastern German is to supply around 4,500,000 tonnes of "mined products" which will consist of brown coal and brown coal briquettes worth 171,000,000 (240,000,000) E.U.

★

Barclays Bank, D.C.O. report that promising deposits of gold have been found in the Lisungwe Valley, about 50 miles from Blantyre, Nyasaland. It is stated that the gold is contained in rock of granite-like nature, and lies at a depth of 90 ft. The samples assayed so far are said to indicate that the ore is above average quality for Africa.

★

The United Kingdom Atomic Energy Authority is believed to be holding most of the world's stocks of protactinium, a rare radioactive element standing next below uranium in the Periodic Table. It occurs in minute quantities in natural ores containing uranium, with which it is in radioactive equilibrium. Although its existence has been recognized for many years, it has proved remarkably resistant to attempts to isolate it in significant amounts. For this reason, protactinium is of considerable scientific and technical interest, and for some time work has been carried out by chemists at the Atomic Energy Authority's Windscale works in order to separate it from certain wastes occuring in uranium production. These operations have now resulted in the successful separation of 100 grams of protactinium from nearly 60 tons of the waste material, and this amount probably represents the bulk of the world's supply, at about £1,000 per gram. Some of this material will be supplied to the United States Atomic Energy Commission.

★

It is reported from Hanoi that a team of prospectors, working at the Cho Dien zinc mine, in the Bac Can province of North Viet Nam, have completed their programme under the current three-year plan, being the first unit in the republic to achieve its target.

★

The Czechoslovak State Trading Corporation "Metalimex" has recently started trial purchases of iron ore from new sources, including Morocco, Angola and Tunisia. Experience has been obtained with processing of sample consignments from Tunisia, and it is considered likely that these purchases will be repeated in the future. Czechoslovakia is already considering increasing her iron ore imports from Sweden by about 50 per cent.

★

Rumania has easily passed her target for output in relation to iron, steel and rolled products for 1959, it has been announced, and plans to raise production considerably during 1960. The Draft Economic Plan for next year was made public on December 6 by the First Secretary of the Rumanian Workers' Party, Gheorghe Gheorgiu-Dej. In order to achieve an increase of the national income by 12.5 per cent, large-scale investment, amounting to 59 per cent of the total investment, is to be made in industry. As a result of this, and of more efficient utilization of existing plant, industrial output is expected to increase by at least 14 per cent. In iron ore mining, however, output is expected to go up by 27 per cent, with a production figure for the year of 1,400,000 tonnes; in the steel industry, it is planned to raise output by 22 per cent, giving a figure of 1,700,000 tonnes; and rolled products, with an increase of 51 per cent, should produce 1,140,000 tonnes

In our issue of December 4, it was noted that Marion Power Shovel Co. excavators and cranes are to be manufactured in Scotland at the Dalmuir works of Babcock and Wilcox Ltd. These works, illustrated herewith, occupy a site area of 35 acres including a deep water basin and wharfage served by an 80-ton hammerhead crane

★

Preparations are in progress at VEB Zinnerz, in Altenberg, near Dresden, on the site of Europe's largest deposits of tin ore, to arrange for the extraction of lithium required for the projected extention of the East German chemical industry.

★

A large modern phosphate mine has recently been opened at New Hailieh, in the north-east province of Kiangsu, in East China. Rock phosphate was discovered there in 1919, at the foot of the Chinping Mountain which rises on the outskirts of New Hailieh, but for three decades its exploitation was by hand methods only, annual output averaging about 20,000 tonnes of phosphate rock. In 1949, however, detailed geological survey of the area was commenced and this confirmed the existence of very rich deposits. Exploitation was soon begun, and has been carried on ever since on an ever-increasing scale. The plant and methods employed are reported to be extremely up-to-date, both with regard to efficiency and safety. When in full production the mine should have an annual output of 1,200,000 tonnes of phosphate rock, from which 300,000 tonnes of phosphate will be extracted. It is expected that output during the first year of operation will be about 400,000 tonnes of phosphate rock.

★

Development work at the Toquepala copper deposits in Peru is reported to be well ahead of schedule and it is expected that the first shipment of blister copper will be made from the port of Ilo in January, 1960. When in full production, exports should total some 140,000 tons of copper annually.

★

It is reported from Japan that six companies are co-operating in developing a Bolivian copper mine, and securing the copper for Japanese industry. They are Nittoh Chemical, Dai Nippon Sugar Manufacturing, Dowa Ming, Chu Ito Trading, Nichimen Jitsugyo Trading and Nittoh Metal and Mining Company. These companies are to develop the Chacarilla copper mine, 90 miles south-west of La Paz, with an authorized capital of 400,000,000 yen. A survey of the mine has been made, and a contract is likely to be signed with the Bolivian owner for purchase. Copper ore deposits were estimated at 900,000 tons averaging 4 per cent copper. If development is successful, monthly production is scheduled to reach between 700 to 1,000 tons of ore monthly, as from August, 1960. All output would go to Japan in the form of concentrates.

★

The Eire Government has approved an order guaranteeing further borrowing of £55,000 by the St. Patrick Copper Mines of Avoca, County Wicklow, a subsidiary of the Mogul Mining Corporation of Toronto. Mr. Lynch, the Minister for Industry and Commerce, states that the company now proposed to open up new deposits at Avoca and to mine 1,000 tons of ore per day from them. This new development should enable them in due course to discharge their liability in respect of state-guaranteed loans. Last year the Eire Government guaranteed the borrowing by the company to the extent of £1,300,000.

★

Silver Standard Mines of Canada is proceeding with plans to put their iron properties on Moresby Island into production. It is estimated that the financing of the equipment and pre-production expenditure will be about $2,500,000. The property has proved deposits of not less than 1,500,000 tons of iron ore.

Metals and Minerals

Aluminium Prices Move Up

Alcan (U.K.) Ltd. has raised its aluminium price in the U.K. to £186 per l.ton, delivered customers' works, with effect from Wednesday, December 16. This price, which applies to Alcan 99.5 per cent minimum purity aluminium ingot in 1 to 50 lb. form is £6 above the previous price. There is no change in premiums charged for ingot in other forms, purities and alloys.

This move is in line with a price increase of ¼ c. per lb. on primary ingots announced by Aluminium Ltd., effective immediately, on all markets except the U.S. The new overseas price level is 23.25 c. per lb. The U.S. price remains at 27.70 c., but the Canadian market price will conform to the new overseas quotation. Alcan has announced a corresponding increase of 3.5 per cent in its semi-fabricated products prices.

Aluminium Ltd.'s decision to raise its price in markets other than the U.S. has doubtless been prompted in part by the improvement in sales, as borne out by the company's recent announcement that production of primary aluminium at its Isle Maligne (Quebec) smelter is to be increased by 22,000 l.tons per year by the reactivation of one potline. A further 12,500 tons per annum will also be added to the production rates of its Kitimat and Shawinigan smelters. On completion of the presently planned increase, the operating rate at the company's Canadian smelters will be 595,000 tons a year or about 77 per cent of capacity.

Sir Ivan A. R. Stedeford, chairman of British Aluminium, has reported a gradual improvement in orders, particularly from the home market, during the seven months to July 31, 1959. He added that this trend, though likely to continue, held no firm promise of an early return to conditions of full recovery, which the directors of the company confidently expect. Steady progress has been made on products development and aluminium is finding its way into many new applications.

In its annual report to shareholders, Péchiney reported that aluminium sales had developed considerably in France and that exceptional measures had to be taken to meet demand pending the start of operations at the new Lacq plant, where production is scheduled to start early in 1960, reaching a planned annual output of 56,000 tonnes after completion. It was further stated that the international consortium, FRIA, would be able to start its first alumina shipments from Guinea in the spring of 1960. The full capacity of this company, in which both European and American funds were invested, would be 480,000 tonnes of alumina a year.

France has imported about 20,000 tons of aluminium from Canada and Norway so far this year. French trade sources said these imports were necessary despite the additional supply of about 38,000 tons of metal from the Cameroons.

The gradual improvement in the tone of business has by no means been confined to the Canadian, U.K. and European markets, for an increasing demand is also reported from Japan, where nearly 10,000 tons of primary aluminium have already been imported from the U.S. and Canada to relieve a current shortage and the government is expected to authorize additional imports. Demand for primary aluminium in Japan during the current financial year (April to March) is expected to exceed supply by between 22,000 and 23,000 tonnes, according to Mr. Kikuo Yasuda, chairman of the Japan Light Metal Association.

The shortage is attributed to an unexpected growth of demand, which had been expected to increase by 15 per cent but has actually risen by 35 per cent. Thus Japan's primary aluminium production capacity, which had been scheduled to expand from 90,000 tons in the last financial year to more than 100,000 tons in the current financial year, has been unable to catch up with the growing requirements. Japanese capacity is to be enlarged to more than 130,000 tons in the next financial year. Generally speaking, prospects for the aluminium markets in Japan are regarded as very good for the first half of the 1960/61 financial year, but thereafter the outlook is not yet clear.

Mr. Kenneth Hall, a senior technical officer of Alcan, will shortly be arriving in Tokyo to give technical assistance to four Japanese fabricators associated with Aluminium Ltd. An announcement by Alcan (Asia) Ltd. said that, while he would live in Tokyo, Mr. Hall would also travel in other areas of the Far East to assist those fabricators who were consumers of aluminium ingots produced by his company. Mr. Hall, a vice-president and director of Aluminium Laboratories Ltd., is an expert in aluminium fabrication.

In the U.S. the United Steel Workers' Union and aluminium industry negotiators have reached a broad scale general agreement on a new labour contract and are now working to iron out local issues and minor disagreements. Meanwhile, Alcoa has announced an increase in the price of pig aluminium by 1.3 c. per lb. to 26 c., applicable only to the U.S. In markets outside the U.S., Alcoa will increase prices by ¼ c., thus following the example of Aluminium Ltd. Reynolds will also increase its price for primary aluminium by ¼ c. in all markets except the U.S.

*

Norway will probably be Europe's biggest producer of primary aluminium in a few years, states, Mr. Nils Ramm, a director of A/S Norsk Aluminium Co. Production in 1959 will total some 145,000 tonnes, equivalent to that of West Germany and a little less than that of France. Present plans envisage an annual output capacity of some 230,000 tonnes, but further expansion is possible. In 1958 Norway exported some 110,000 tonnes, but the 1959 figure will be considerably higher.

*

Under the current Seven-Year Plan a new aluminium plant is to be erected at Lauta, in the county of Hoyerswerda, East German Republic. This plant will come into initial production in 1962, its annual production capacity reaching 20,000 tonnes of primary metal by 1964. Bauxite imported from Hungary will be the raw material.

U.K. BERYLLIUM PLANT

Europe's first wrought beryllium plant has been brought into operation by Imperial Chemical Industries. Costing nearly £1,000,000, it was completed in about a year and has a capacity of between 7 and 10 tons annually of products costing about £160 a lb. Its inception and future development are closely linked with U.K. progress in nuclear engineering, and in particular to plans and prospects for advanced gas-cooled reactors in which beryllium is used for fuel cans and ancillary reactor equipment. As indicated in our issue of December 4, beryllium is also of increasing importance in the aircraft and guided missile fields.

*

In his annual address to shareholders of Tube Investments Ltd., Sir Ivan A. R. Stedeford stated that initial orders for beryllium tubes had been received from the U.K. Atomic Energy Authority, as well as token orders from a number of other countries. The company has arranged to make some of its techniques available in the U.S. under a "know-how" agreement.

NEW NICKEL ALLOYS

The current issue of *Wiggin Nickel Alloys*, published by Henry Wiggin and Co. Ltd., contains an interesting departure from normal practice, in that reference is made to certain materials which as yet are not commercially available but for which research and development indicate the possibility of ultimate successful application.

Hitherto the *Nimonic* series of high-temperature alloys have all been produced by air-melting techniques. It is generally accepted, however, that melting in vacuum results in the development of even better high-temperature properties. A considerable amount of investigation has been carried out in the Research Laboratories of the Mond Nickel Co. Ltd., and, as a result, five alloys have, so far, been found to be worth further development. Three of these alloys are wrought alloys, while two are casting materials. None is as yet produced in quantity, but there is every hope that those having useful properties will become commercially available in the near future.

The International Nickel Co., Inc., has confirmed reports in the trade that a remarkable new family of very high strength alloy steels (containing titanium and/or aluminium) has been invented in its Research Laboratories. Nominally identified as 25 per cent nickel steels, they achieve unique properties by air-cooling from the heat-treating temperatures. Yield strengths in excess of 250,000 p.s.i. with 6-10 per cent elongation and above 20 per cent reduction of area are obtainable in section thicknesses where such high-strength properties had not previously been attained. In some cases yield strengths of more than 290,000 p.s.i. have been achieved.

*

C. Tennant Sons and Co. Ltd., have been appointed U.K. distributors for the Freeport Nickel Co.

KOREAN TUNGSTEN

The Ministry of Commerce and Iinustry at Seoul has announced its approval of a one-year extension of the overseas sales contracts between the government-controlled Daihan Tungsten Co. and the Continental Ore Corp. of New York. The extended sales contract will be in force until January 1961. South Korea at present exports about 300 tonnes of tungsten ore each month to the Continental Ore Corp. which is the exclusive sales agency in the U.S. for Daihan Tungsten.

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A new process for producing large tungsten ingots, weighing up to 200 lb., has been announced by Dr. Paul Schwarzkopf, president of Schwarzkopf Development Corporation, of New York City, and of Metallwerk Plansee in Reutte, Tyrol, Austria. In this process blocks of about 8 in. dia. and 8 in. high are formed from tungsten powder in large capacity presses, the blocks being sintered indirectly in large, h.t. furnaces and then forged at high temperatures. Ingots produced by this method are now available for export from Tyrol. It is stated that exports to the U.S. may reach a value of up to $3,000,000 by the end of 1960. Tyrol imports its raw materials for the tungsten ingots from South America and from the U.S.

Already manufactured for commercial and industrial use in Austria, the ingots will be used in the U.S. in the rocket missile and jet propulsion fields.

★

A tungsten and molybdenum fabricating facility costing $2,000,000 is being completed at Fair Lawn N.J., by the Wah Chang Corporation of New York City. The project is part of the firm's expanding commitments in the research and development of space and atomic metals. The plant, which will be operating next spring, will be able to supply tungsten and molybdenum in practically any form, from powder to fabricated forms such as rod, wire and sheet.

★

There has been no further change in quotations in the London wolfram ore shipment market, prices still ranging from 147s. 6d. to 152s 6d. per l.ton unit c.i.f. Europe.

Buying interest appears to have moderated, but consumers are reported to be not too well covered ahead. Any signs of easing could induce from fresh demand, but sellers are not pressing at the moment.

Indicative of the improving outlook is the news that King Island Scheelite (1947) Ltd., which ceased mining tungsten ore in August, 1958, due to the low prices then prevailing, is to reopen its mine in January.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

In spite of lessening interest, due to the approach of the holiday season and end of the year, prices have kept up with the exception of that of tin. A weaker undertone is discernible in both tin and lead, whilst that of zinc remains firm and that of copper can best be described as uncertain.

KENNECOTT SETTLEMENT ENDS COPPER RALLY

Copper prices fell sharply at the beginning of the week on news from the U.S. that the Asarco plants would be back in operation within a few days, that San Manuel had come to an agreement, and that talks between the Union and Kennecott were proceeding. Subsequently, however, a re-assessment of the situation, coupled with the news that the Kennecott talks had run into difficulties, produced a sharp rally. This petered out on Wednesday night when rumours, subsequently confirmed, circulated that agreement had been reached with the Mine, Mill and Smelter Workers' Union. It is interesting to note, in spite of this, good business in physical metal is reported from the U.S. at levels up to 37½ c. per lb. for January delivery.

In London, outside demand has remained satisfactory and with stocks showing a further decline of 400 tons at 5,497 tons, the backwardation has remained although the tendency to widen was curtailed by offerings of nearby metal during the early part of the week.

In assessing the overall situation, the figures published by the Copper Institute for the month of November are of little value although, perhaps, they may contribute some pointer when read in conjunction with the consumer figures which are issued later in the month. The figures show that in the United States production of refined copper in November totalled 37,299 tons as compared with 44,218 tons in October. Domestic deliveries totalled 83,626 tons against 68,648 tons and stocks of refined copper in producers' hands stood, at the end of November, at 74,642 tons against 78,308 tons a month earlier. Outside the United States production of refined copper increased to 148,619 tons from 137,498 tons in October and deliveries also showed a slight increase at 145,625 tons as compared with 142,297 tons: end November stocks showed a decline at 235,859 tons when compared with 252,130 tons at the end of October.

PROMPT TIN STILL SCARCE

The tin market is feeling the effects of the increase in export quota announced for the next period and also of a diminution in consumer interest, especially in the U.S. where the possibility of a recommencement of the steel strike towards the end of January is beginning to have a dampening effect. Prompt metal, however, is scarce and the backwardation has shown a tendency to increase and stocks in official warehouses showed a slight fall of 59 tons at the beginning of the week to a total of 7,918 tons.

It is believed in some quarters that the Buffer Stock Manager may be purchasing tin in both Singapore and London but others consider that this is hardly likely in view of the possibility that more massive support may have to be forthcoming towards the end of the first quarter of next year should the U.S. steel strike recommence and continue for any length of time: in this connection it must also be borne in mind that the present agreement expires in the middle of 1961 and that it is probable the Buffer Stock Manager does not wish to have stocks much in excess of 10,000 tons when the time for liquidation in one way or another has to take place.

On Thursday the Eastern price was equivalent to £789½ per ton c.i.f. Europe.

NO CHANGE LIKELY IN LEAD-ZINC QUOTAS

The lead market has developed a weaker undertone with the U.S. quotation being reduced by ¼ c. per lb. to 12½ c. per lb. New York; even this price may not be held as the Asarco plants are now beginning to operate and it is known that large tonnages of lead are held at the smelters.

The zinc market remains firm with prompt metal being in demand and this state of affairs is expected to continue well into January. There was a momentary weakness early in the week when it was rumoured that the Board of Trade were going to release some more zinc, perhaps even a tonnage in excess of 6,000 tons which is known to be awaiting a suitable moment for disposal. A spokesman of the Board, however, refused to either confirm or deny the rumour and, as the majority opinion is that nothing will take place until after the turn of the year, prices picked up.

The next U.N. meeting on lead and zinc is still not definitely fixed but when it takes place early in the New Year it is expected that producers will report that their voluntary restrictions on availability of zinc have not been renewed after December 31 (on which date they lapse at the moment) but that steps are still being taken to support the lead price.

Attempts being made in the U.S. by some U.S. smelters of lead and zinc to have the present quota system cancelled in favour of higher tariffs, have apparently failed as the Tariff Commission has turned down the appeal. This seems to indicate that the present quota system will be maintained throughout 1960 as it appears unlikely that any further attempts will be made in view of the Presidential Election scheduled for next autumn.

Closing prices are as follows:

	Dec. 10		Dec. 17	
	Buyers	*Sellers*	*Buyers*	*Sellers*
COPPER				
Cash	£257½	£258	£251	£251½
Three months ..	£241	£241½	£236	£236½
Settlement ..	£258		£251½	
Week's turnover	11,800 tons		9,625 tons	
LEAD				
Current ½ month	£71½	£71⅞	£72⅛	£72½
Three months ..	£71½	£71⅞	£72⅛	£72½
Week's turnover	5,475 tons		7,400 tons	
TIN				
Cash	£792½	£793	£787	£788
Three months ..	£789½	£790	£783	£784
Settlement ..	£793		£788	
Week's turnover	415 tons		655 tons	
ZINC				
Current ½ month	£96½	£97	£94½	£95
Three months ..	£90½	£90⅝	£90⅛	£90⅜
Week's turnover	5,125 tons		5,775 tons	

London Metal and Ore Prices appear on page 642.

Mining Finance

Brandberg West to Start Next Year

Since the take-over battle of the South-West Africa Company three years ago, most of the news from Swaco has been of mine closures and retrenchment rather than of expansion. The report and accounts of Swaco for the year to June 30 last, however, reveal that this reorganisation was no more than a prelude to a new stride forward.

Production at the Brandberg West deposit of the South West Africa Company should recommence early in 1960. The initial rate will be 20,000 tons per month, equivalent to the capacity of the newly installed plant, but the optimum economic rate of working is dependent on the size of the deposit, which is not yet fully delineated. A campaign of diamond drilling started some months ago to test the tin/wolfram orebody laterally and vertically is still in progress.

At Berg Aukas, the lead vanadate property owned by the S.W.A.Co., a flotation section has been added to the plant, and the crushing and grinding sections have been increased in capacity. Ore reserves at June 30 last totalled 940,000 tons, averaging 1.96 per cent Vanadium oxide, 6.19 per cent lead and 35.6 per cent zinc, down to approximately 1,000 feet below surface. Drilling during the year has indicated substantial zones of secondary lead-zinc mineralization at depths down to 2,100 feet, but estimates of tonnages are so far too tentative for inclusion in reserve figures.

S.W.A.Co's. income in the year to June 30 last showed a sharp reduction as a result of the suspension of operations at Abanab West and Brandberg West, the latter pending the delivery of the new plant referred to above. This fall in income, however, was more than offset by a consequent fall in operating and administration costs. In addition, the improvement in base metal prices during the year resulted in an improvement in revenue from S.W.A. Co's. shareholding in the Tsumeb Corporation. Overall, therefore, the results for the year showed a great improvement, although an operating loss of £63,897 was incurred. Last year's loss, after eliminating exploration and investigation expenditure, amounted to £269,129.

The exclusive mining and prospecting rights enjoyed by the South-West Africa Company over 3,000 square miles expires in 1962.

GOLD FIELD'S NEW STEP FORWARD

The progress of the gold mining industry, like most forms of growth, is carried forward in great surges of activity, followed by periods of relative inactivity. This is true not only of the industry as a whole, but of the mining houses which compose it. Thus, the O.F.S. goldfield was largely the result of such a surge on the part of Anglo American, and the present opening-up of the Kinross field stems from a similar step forward on the part of Union Corporation.

Gold Fields' last great stride was the opening-up of the West Wits line twenty-odd years ago. Until the beginning of last year, the group continued to expand in line with the rest of the industry, but with no signs of a further great advance. However, Mr. Annan's statement covering 1958-9, together with the various mergers and take-overs announced by Goldfields earlier this year, leaves no doubt but that 1959 marks an important milestone in the groups' affairs.

Briefly, the events which have led to this resurgence were a succession of acquisitions of companies outside the group; and a reorganisation within. The most important acquisition, that of New Union Goldfields, has brought in its train two great advantages: ownership of a South African-registered finance house; and the presence within the group of Mr. H. C. Drayton, with the large resources of the Drayton group of companies in the background.

What will come of these important changes can only be a matter of conjecture. Certainly, one of the most important events of Gold Fields' year on the mining side has been the acquisition of mining rights over a large area to the South of the West Wits line. A prospecting programme is well under way, and it may be that in two years, when the programme has been completed, Gold Fields may find itself with a new group of young producers to bring to the market.

Extracts from Mr. Annan's statement are on p. 643.

BOARD CHANGES AT GOLD FIELDS

Consolidated Gold Fields announce that Mr. Robert Annan, who has been a director since 1935 and chairman since 1944, intends to retire on December 31, 1960. He will be appointed president, and will continue to be available to the group for advice and consultation. At the invitation of the board, Sir George Harvie-Watt will assume the chairmanship from January 1, 1961. Sir George has been a director of Gold Fields since 1944, and has been deputy chairman for the past five years.

The position of deputy chairman will be taken over by Mr. G. G. Potier, who has been on the Gold Fields board for the past two years. Mr. P. S. Hammond, who has been resident director of Gold Fields in South Africa since 1954, will be retiring at the end of this year. His place will be taken by Dr. W. J. Busschau.

Mr. R. H. A. Neuschild, who has been a director for four years, is to relinquish his executive duties on September 30, 1960. He will, however, remain on the board. Mr. Martin Rich will be appointed to the Gold Fields board on April 1, 1960, on relinquishing the chair of New Union Goldfields and returning to the U.K.

MANGULA RIGHTS ISSUE

M.T.D. Mangula has announced plans for a rights issue of 2,000,000 new 5s. shares at 9s. 6d. each. Rights will be in the proportion of one new share for every nine 5s. stock units held. Messina (Transvaal) Development, the parent company, will underwrite the issue, and will subscribe all the shares to which it is entitled and any shares arising from fractions.

The proceeds of the issue will be used to repay the £950,000 now outstanding on loan account from the parent company. The new shares will not rank for the maiden dividend to be paid in January. February 3 will be the closing date for the offer.

A progress report accompanying the offer states that working costs during the current financial year are not expected to exceed 22s. per short ton of ore, as originally forecast. The second aerofall mill unit was installed in the first quarter of 1959, and production has reached the target of 3,000 short tons per day.

Messina are currently quoted at about 12s. and look quite cheap at the price. Shareholders should certainly take up their rights.

MAWCHI — ANOTHER DISAPPOINTMENT

Three months ago, an interim report issued by Mawchi Holdings referred to the fact that an agreement negotiated between Mawchi and the Burmese Government last May had not arrived in London for ratification. In fact, a letter was received from Rangoon immediately the statement had been circulated, which "withdrew the whole basis on which negotiations had been conducted". The Burma Government has, apparently, reverted to the unacceptable position it maintained before the first negotiations in November 1958. This involves the remitting to Burma in sterling of half of whatever new money was required to recapitalise the joint venture company, Mawchi Mines (1957).

In an effort to overcome this new obstacle, Mawchi has put forward an alternative proposition. Details have not been disclosed at this stage, but the scheme has as its objective the raising of a third party loan in order to re-capitalise the joint company so that mining can recommence. The Mawchi mine was closed fifteen months ago after an outbreak of security troubles.

Meanwhile, it is all the more important that the plans for the employment of Mawchi's resources outside Burma should be pressed ahead. In his circulated statement, Lieut.-Gen. Sir Ernest Wood, chairman of Mawchi Holdings, says that the plans are proceeding. Mawchi's loss for 1958-9 was £11,944, against £71,986 in the previous year. This sum includes care and maintenance contributions totalling £3,155. Current assets, including investments at market prices on March 31, total £117,812, and liabilities £53,270. In addition, investments "acquired for holding" were carried in the books at £73,414, while the investment in the joint venture company stands in the balance sheet at £573,312.

STOCK EXCHANGE YEAR-BOOK FOR 1959

With the publication of Vol. 2, the 1959 edition of the "Stock Exchange Official Year-Book" is now complete. Vol. 2 contains the Commercial and Industrial sections, the general index and the classified list.

The 1959 edition of the Register of Defunct and Other Companies is also now available. This contains particulars of companies and securities no longer active.

The Stock Exchange Official Year Book is available from Thomas Skinner (Publishers) Ltd., Gresham House, Old Broad Street, E.C.2, at £8 5s. for the two volumes, which are not sold separately. The Register of Defunct Companies, available from the same address, costs £1 10s.

Financial News and Results

Welgedacht Write-down Confirmed.—An order of the Supreme Court has confirmed the writing-down of the issued capital of Welgedacht Exploration from 1,358,030 shares of 10s. each to the same number of 4s. 6d. shares. Shareholders approval was given on November 17. Welgedacht's main interest is the Utrecht Colliery, now that mining has ceased at the Welgedacht gold mine.

London and African.—The working profit of London and African Mining Trust in the year to September 30 last amounted to £20,392, some £4,500 greater than in the preceding twelve months. The improvement was largely attributable to better sharemarket conditions, reflected in higher profits from sharedealing. The dividend was increased from 10 per cent to 12½ per cent, but the carry forward is reduced from £25,616 to £18,458. As well as its quoted portfolio, now worth £302,875 against a book value of £270,000, London and African has a large interest in Mines Development Syndicate, referred to here two weeks ago. Extracts from the statement by the chairman, Mr. W. J. C. Richards, appear on p. 644.

Amalgamated Collieries Pays More . . .—Estimated earnings before tax of Amalgamated Collieries of South Africa in the year to December 31 next are £1,062,000, compared with £964,160 last year. A final dividend of 3s. per share has been declared, making 4s. 6d. for the year against 4s. 3d. for 1958.

. . . But Vryheid and Coronation Pay Same.—Both Coronation Collieries and Vryheid Coronation are paying dividends which, taking into account intervening 100 per cent scrip issued, are equal to the previous year's. Vryheid's final is 10½d., making 1s. 9d., while Coronation's is 6d., making 1s. 1½d.

No Payment from Tongkah Harbour.—Profits of Tongkah Harbour Tin Dredging in the year to June 30, 1959, were sharply reduced from £77,616 to £27,637 after Thai income tax of £6,000 against £10,000. The dividend is passed — last year 1s. per share was distributed. The balance carried forward is increased from £103,908 to £131,545. The dredge of the Bidor section has been sold for scrap, but reconstruction of the sea dredge at Juru, near Penang was almost completed at the end of the year. The meeting is being held in Kuala Lumpur today.

Henderson's Offer for Witbank Consolidated.—The offer by Henderson's Transvaal Estates for Witbank Consolidated Coal Mines, referred to briefly last week, is of three Hendersons shares and 20s. in cash for every four Witbank shares. The offer is conditional on acceptance in respect of 90 per cent of Witbank's capital. If the offer is accepted, the Witbank Consolidated mine will be operated in conjunction with the adjoining coal interests of the Henderson group.

Tekka's Year.—Losses made during the early part of Tekka's financial year when the mine was operative were too great to be entirely offset by profits made after the mine was shut down under pooling arrangements within the Osborne and Chappel group. The result was a loss for the year of £6,636 before tax and depreciation, compared with a profit of £15,929 in the preceding year. No dividends were paid, and the carry-forward is reduced from £24,893 to £17,880. The meeting was held in Redruth on Wednesday.

The Fifth International Mineral Processing Congress

A series of tours has been arranged for those attending the International Mineral Processing Congress next April, which is being held at Church House, Westminster, London, S.W.1, April 6 - 9, under the auspices of the Institution of Mining and Metallurgy. The tours will visit the following areas : Tour No. 1 — April 10 - 15, to North England and Scotland, visiting Colvilles ore handling plant and steel works at Ravenscraig ; British Aluminium Co.'s plant at Fort William; and Imperial Chemical Industries' anhydrite plant at Billingham.

Tour No. 2 — April 10 - 14, South Wales and West Country, visiting Abbey Steel Works of the Steel Company of Wales; National Coal Board, Central Research Establishment; and National Smelting Co.'s plant at Avonmouth.

Tour No. 3 — April 10 - 14, to Cornwall, visiting English Clays, Lovering Pochin & Co., Lee Moor clay plant near Plymouth; South Crofty mine, Holman Bros., and Camborne School of Metalliferous Mining; Hydraulic Tin, and Geevor Mines.

Tour No. 4 — April 10 - 15, Midlands. Imperial Chemical Industries' lime quarries, screening and treatment plant at Buxton, and Glebe Fluorspar mine; Appleby-Frodingham Steel Co. at Scunthorpe; International Combustion Ltd., grinding, screening and heavy machine manufacturers at Derby; Manvers Main Central coal preparation plant.

Tour No. 5 — April 11 - 13, London area. Arrangements are being made for members who wish to stay in London after the Congress to visit research establishments and metallurgical works. The following companies and establishments have agreed to receive parties : Britannia Lead Co.; British Non-Ferrous Metals Research Association; Fraser & Chalmers Engineering Works (G.E.C.); Murex Ltd., Rainham; National Chemical Laboratory; Royal School of Mines; Fulmer Research Establishment; Ford Motor Co.; it may be possible to arrange visits to plants not listed above at the special request of members.

A dinner and dance will be held at Grosvenor House on April 9; various sightseeing tours and visits to local historic places have been arranged in conjunction with most of the above tours, and an Exhibition of Mineral Processing Machinery, sponsored by the British Chemical Plant Manufacturers' Association will be held in Church House throughout the Congress.

This Exhibition is being arranged so that members may meet representatives of machinery manufacturers. Further information may be obtained from The Secretary of the Institution of Mining and Metallurgy.

LONDON MARKET HIGHLIGHTS

Although the South African share markets became subdued in front of the approaching holidays and in the face of the counter attraction of industrial shares, the undertone was remarkably firm. Once again Johannesburg support for Far West Rand issues helped matters and such shares as Vaal Reefs, West Driefontein and Western Reefs were all favoured. A certain amount of switching lowered the price of West Wits to 83/9d. and raised the price of the more favoured West Rand Investment Trust to 70/9d.

The O.F.S. market was largely left to itself. About the only real move was a sudden jump in Loraine to 37/9d.; this was linked with talk at the Cape of high development values. The newcomers, Bracken and Leslie, were dealt in their fully paid form for the first time, the respective prices being 27/3d. and 19/3d.

Finance companies came in for a certain amount of investment demand. Gold Fields, for example, gradually crept up to 98/9d. following the generally encouraging meeting, and there was support for Union Corporation which raised them to 80s. 3d.

De Beers became a curious market in the Diamond group. At first, the appearance of the excellent Consolidated Diamond figures with news of a sharp rise in profits and an even sharper rise in dividend raised the shares to 185/7½d. on this. Almost immediately, however, the price fell back to 178/9d. on what was suspected to be forced selling at the Cape. Later the price recovered to 181/10½d. in the expectation that the final dividend next March should more than make up for price fluctuations in the meantime.

Base metal shares moved rather irregularly. Nchanga eased slightly to 71/3d. despite the fact that the interim due any day now is generally expected to be good. Others moved narrowly with the fluctuations of the metal price while M.T.D. Mangula at 12/- made little response to the proposed one-for-nine rights issue at 9/6d.; Messina shares hardened against the general trend to 129/4½d.

As far as the tin share market was concerned, earlier enthusiasm became subdued when the East stopped buying for a while at the beginning of the week. Local nervousness was seen with regard to just how well the metal price would stand up to the higher sales quotas which will be in force in the next quarter. As a result there was a certain amount of profit taking. This, however, did not last very long and the market recovered. Malayan Tin helped matters by the chairman's forecast that the dividend rate of 1/6d. should be maintained in the current year on the capital when it is doubled by the one for one scrip issue.

Lead-zinc shares moved narrowly, an interesting feature being a steady rise in Consolidated Zinc to 75/-; this reflected the strength of their big holding in Interstate Oil.

Elsewhere Hendersons improved to 16/6d. for no very obvious reason. Globe and Phoenix was a strong market, rising to 40/-. There was talk that this company might be another take-over candidate in Rio Tinto's gold plan.

Safety and Health Information Centre

Early in 1960 the Industrial Safety Division of the Royal Society for the Prevention of Accidents will begin its part in an international scheme intended to promote wider understanding of industrial safety and allied subjects among safety officers, works managers, industrial physicians, trade unionists and research workers. The essential aim of this scheme is to make information available, rapidly and systematically, on literature and legislation dealing with all aspects of occupational safety and health. Every type of industrial activity will be covered, including engineering, mining and quarrying, agriculture, transport, dock work, public services and civil engineering. Distribution of the information will be made through the International Labour Office by means of index cards.

Other countries co-operating with the I.L.O. in this scheme are France, Germany, Italy, Austria, Belgium, Denmark, the Netherlands, Poland, Sweden and Switzerland.

Other organizations in Britain which have agreed to co-operate with the Society in this valuable work, are the Association of British Chemical Manufacturers, the British Iron and Steel Federation, the British Occupational Hygiene Society, the Chemical Society, the Department of Scientific and Industrial Research, the Association of Industrial Medical Officers, the London School of Hygiene and Tropical Medicine, the National Institute of Industrial Psychology and the Safety in Mines Research Establishment. All these organizations will assist by making documents and data available to the Society for transmission to the I.L.O.

The Cost to British subscribers will be £14 5s. a year, and all enquiries should be addressed to the Royal Society for the Prevention of Accidents, Terminal House, 52 Grosvenor Gardens, London.

COMPANY NEWS

Divisional stores for the Durham Division of the National Coal Board are to be constructed by Holland and Hannen and Cubitts (Scotland) Ltd., at Lambton. Work on the £220,000 contract will start during February, 1960. It provides for the construction of an office block, stores building, boiler house, garage, weighbridge, rail track and roads.

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The Atlas Copco Organization, in collaboration with the Swedish Mining Association are establishing a travelling bursary for a study tour of Swedish mines, to be awarded in 1960. The tour, will be of six weeks' duration during March-April. The bursary is open to mining graduates from any country, who have at least three years' experience, and applicants who desire further information should apply to the Institution of Mining and Metallurgy, 44 Portland Place, London, W.1. Closing date for entries for this bursary is February 1, 1960.

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Powell Duffryn announce that with effect from December 1, 1959, Powell Duffryn Engineering Co., has acquired the whole of the share capital of Pipeweld Ltd.

The English Electric Co. in 1959

During 1959 the English Electric Company has continued its traditional service to the mining industry, supplying equipment for mining use to operating companies both in the United Kingdom and overseas. Orders have been received for the electrical equipment of mine winders for home and overseas customers and, in each case, the mechanical equipment has formed part of the order.

For a South African customer one notable order covers the supply of a 5,400 h.p. (r.m.s.) Ward-Leonard winder. The 70 r.p.m. direct-coupled motor is to be supplied from two 2,080 kW. generators, and will wind the conveyances through the 6,600 ft. shaft at 3,600 ft./min.

Following the orders received in 1958 for mercury-arc converter fed winders, a further order of note has been received from the National Coal Board. The d.c. motor, developing 1,750 h.p. (r.m.s.) at 350 r.p.m., is of laminated frame construction and is fed by four converters for 12-phase operation. With the closure of several collieries in the United Kingdom, some of which employed English Electric winders, orders have been received for the transfer of these equipments to other more productive collieries. In some cases, modifications have been requested to bring the equipments in line with revised requirements.

During the year winder equipments have been commissioned in Canada, Australia, South Africa and the United Kingdom. One of the winders commissioned in Canada, for hoisting nickel-copper ore, is operating on automatic control. The company undertakes on a comprehensive basis the electrical equipment of surface installations in the form of coal preparation plants, mine car handling plants, etc. For controlling the sequence starting of the motors for such plants, a new multi-panel motor control board has been developed, having either fixed or drawout-type starter units. Drawout-type starter units are embodied in a board that is fully accessible from the front, so saving the normal space required for rear access.

A further development of note is a new all dry type of charger for underground battery locomotives using silicon rectifiers and an air-cooled transformer. This charger retains the controlled charging rate feature of previous English Electric equipments, but is designed for a higher output.

In Canada, where water turbines are manufactured by the English Electric Group at the John Inglis plant, three 200,000 h.p. Francis turbines have been commissioned at the Chute-des-Passes power station of the Aluminum Company of Canada. The remaining two units are in an advanced stage of erection. These turbines are amongst the most powerful in the world and are controlled by electro-hydraulic governors incorporating magnetic amplifiers, developed in the English Electric governor laboratories in Great Britain.

LONDON METAL AND ORE PRICES, DEC. 17, 1959

METAL PRICES

Aluminium, 99.5%, £180/£186 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £190 per ton
Arsenic, £400 per ton
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 9s. 6d lb.
Cerium (99%) net, £16 0s. lb. delivered U.K.
Chromium, Cr. 99% 6s. 11d./7s. 4d. lb.
Cobalt, 14s. lb.
Germanium, 99.99%, Ge. kilo lots 2s. 5d. per gram
Gold, 250s. 5d.
Iridium, £23/£25 oz. nom.
Lanthanum (98%/99%) 15s. per gram.
Manganese Metal (96%/98%) £245/£250
Magnesium, 2s. 0d./2s. 3d. lb.
Nickel, 99.5% (home trade) £600 per ton
Osmium, £21/£23 oz. nom.
Osmiridium, nom.
Palladium, £8 12s. 6d.
Platinum U.K. and Empire Refined £28 10s. oz. Imported £27/£27½
Quicksilver, £71½/£72 ex-warehouse
Rhodium, £41/£45 oz.
Ruthenium, £18/£20 oz. nom.
Selenium, 50s. 0d. per lb.
Silver, 80½d. f. oz. spot and 79½d. f'd
Tellurium, 18s. lb.

ORES AND OXIDES

Antimony Ore (60%) basis	20s. 0d./22s. 0d. per unit, c.i.f.
Beryl (min. 10 per cent BeO)	250s. per l. ton unit BeO
Bismuth	65% 8s. 6d. lb. c.i.f.
	18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable 48% (Ratio 3 : 1)	£15 15s. 0d. per ton c.i.f.
„ Hard Lumpy 45% (Ratio 3 : 1)	£15 10s. 0d. per ton c.i.f.
„ Refractory 40%	£11 0s. 0d. per ton c.i.f.
„ Smalls 44% (Ratio 3 : 1)	£14 0s. 0d. per ton c.i.f.
Baluchistan 48% (Ratio 3 : 1)	£11 15s. 0d. per ton f.o.b.
Columbite, Nigerian quality, basis 70% combined pentoxides (Ratio 10 : 1). Nb_2O_5:Ta_2O_5	175s. per l. ton unit c.i.f.
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)	156s. 0d. ex. works
Lithium Ore—	
Petalite min. 3½% Li_2O	40s. 0d./45s. 0d. per unit f.o.b. Beira
Lepidolite min. 3½% Li_2O	40s. 0d./45s. 0d. per unit f.o.b. Beira
Amblygonite basis 7% Li_2O	£25 0s. per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£23 0s. d/d
Manganese Ore Indian—	
Europe (46%-48%) basis 6/7s. 6d. freight	73d./75d. c.i.f. nom.
Manganese Ore (43%-45%)	69d./71d. c.i.f. nom.
Manganese Ore (38%-40%)	nom.
Molybdenite (85%) basis	8s. 11d. per lb. (f.o.b.)
Titanium Ore—	
Rutile 95/97% TiO_2 (prompt delivery)	£29 per ton c.i.f. Aust'n.
Ilmenite 52/54% TiO_2	£11 10s. per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	147s. 6d./152s. 6d. per unit c.i.f.
Vanadium—	
Fused oxide 95% V_2O_5	8s./8s. 11d. per lb. V_2O_5 c.i.f.
Zircon Sand (Australian) 65-66% ZrO_2	£16/£16 10s. ton c.i.f.

CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA

YEAR OF EXPANSION

MR. ROBERT ANNAN'S SPEECH

The annual general meeting of The Consolidated Gold Fields of South Africa, Ltd., was held on December 10 in London.

Mr. Robert Annan, chairman, in the course of his speech, said :

It is gratifying to be able to report a material increase in the profits earned by the Group in the year under review and to recommend for the second year in succession an increase in dividend.

Profit and Dividend

The Consolidated Profit and Loss Account of the operating company shows a profit for the year, after charging taxation, of £2,364,000, which is an increase of £651,000, or 38%, when compared with the previous year.

Dividends and Interest on investments again provide the principal contribution to our profits but show a slight fall compared with the previous year due mainly to our having received no dividends from our Platinum holdings.

The total available for appropriation after eliminating the interest of the minority shareholders and after bringing in the balance of unappropriated profits brought forward from last year, is £3,900,000.

By an appropriation of £649,000 the general reserves of the Group have been increased to £4½ million at June 30, 1959. In addition, £515,000 has been appropriated to Investment and Exploration Reserve.

An interim dividend of 1s. 3d. per Ordinary share, less tax, was paid on June 30 and, as the operating company has now declared a Final dividend of 3s. 9d. per share, less tax, your Directors recommend the payment of a like dividend on the increased Ordinary Capital of the parent Company ranking for dividend, which, if approved, will be paid on December 17, 1959.

New Mines Double Output

The gold mining industry in the Union of South Africa continued to expand and is now producing nearly a million and three-quarter ounces each month. This expansion is due mainly to the new mines of the Far West Rand and the Orange Free State. These new mines have practically doubled their output of gold and have more than doubled their profit from gold in the last four years. They now account for 70 per cent of the profit from gold and over 50 per cent of the profit from uranium in the whole field and have not yet reached their full planned production. Our investment is mainly in these mines and has in almost every case brought us increased dividends in the past year.

In the group of mines under our administration the profits as a whole again show an increase but the total of dividends declared is slightly lower as five of the old mines are now making their distributions in the form of return of capital.

Discovery of New Areas

The discovery of the Witwatersrand dates back more than seventy years. Since then, exploration in which all the groups have taken part has resulted in the discovery of new mining areas to the east and to the west of the original field, extending into the Orange Free State. The importance of these discoveries needs no emphasis. Not all the ventures have been successful. Large areas have been prospected and abandoned but as knowledge of the geology accumulates the search goes on, with the hope of still further finds.

In pursuance of this policy we have recently secured options on mineral rights over an aggregate area of 60,000 morgen, that is over 125,000 acres, in a belt to the south of the West Wits line and of Western Deep Levels, extending from the Farm Doornpoort No. 347 in the east to the Mooi River in the west. This area will be tested to see if the reef horizons which have been so profitable on the West Wits line recur at mineable depths as a result of faulting. A programme of exploratory drilling has been started which will take about two years to complete. At this stage one cannot predict what the result may be, but it is a venture with interesting possibilities.

Buell Engineering

The turnover and profits of Buell Engineering, makers of equipment for the collection of industrial dusts and fine products, suffered from the contraction in new investment in the United States but the Company continued to operate profitably. There is a wide field of application for this type of equipment. With a view to expanding its activity Buell has formed a wholly-owned subsidiary in the United Kingdom to deal with non-dollar areas. It is also in process of acquiring the business of the Northern Blower Company, of Cleveland, Ohio, makers, inter alia, of bag filters.

This acquisition will give Buell a full range of equipment to meet all conditions. The importance of dust collection is becoming more widely apparent and the recent recession in Buell's new business may be regarded as temporary.

Other interests call for little comment. We are maintaining our policy of exploration in various parts of the world, concentrating on areas known to be mineral bearing.

Recent Acquisitions

As the result of an offer made last March we acquired the whole of the remaining capital of The African Land and Investment Co., Ltd., in which for many years we owned control. To this company we have now transferred, with Treasury consent, all the administrative and technical services hitherto provided to the various South African companies in our Group by New Consolidated Gold Fields Ltd. This company is a South African registration of long standing and will have its Board of Directors, on which we will have direct representation, in Johannesburg. Its name has now been changed to "Gold Fields of South Africa Limited" which is the original name under which this Group was founded in 1887.

For the last forty years The Consolidated Gold Fields of South Africa, Ltd., has been purely a holding company owning the entire issued capital of the operating company, New Consolidated Gold Fields Ltd., which was formed because the powers conferred by the Memorandum of Association of the parent Company were too limited and could not then be enlarged.

Subsequent changes in the law have now made possible the desired alteration of the Memorandum. We therefore propose to merge the two companies, adopting a new Memorandum and Articles of Association, making Consolidated Gold Fields the main operating company of the group and eliminating the cumbersome two-company structure.

In July and August we made offers to acquire the entire share capital of three companies engaged like ourselves in mining finance, namely, the Anglo-French Exploration Co., Ltd., The H. E. Proprietary Ltd., and New Union Goldfields Ltd. The result was most gratifying as in each case over 90% acceptance was secured. We are, therefore, proceeding under provisions of the Companies Acts to acquire the outstanding balance and make them wholly-owned subsidiaries.

The business of Anglo-French has been similar to our own and about half the value of its investments is in companies already associated with our Group, strengthening our holdings in the Far West Rand and in the Orange Free State.

In New Union we have acquired a finance company of South African registration, administering a group of mining and industrial companies. It will be advantageous to us to have the facilities of a finance company with South African domicile. Its name will be changed to Gold Fields Finance Company (S.A.) Limited.

Through the South African H.E. Proprietary we have again increased our interest in West Wits, Harmony and Free State Saaiplaas. Through the parent H.E. Proprietary we have new interests in Canadian mining and in industrial concerns in the United Kingdom.

An Offer from S. Africa

Finally, we have just accepted an offer from the South African Mutual Finance Corporation (Proprietary) Limited to purchase 250,000 Ordinary Shares out of our unissued capital at a price of 89s. 3d. a share not ranking for the final dividend now recommended.

This transaction is in accord with our desire to encourage the investment of South African capital in the mining industry which forms such an important part of the country's economy.

You will readily appreciate that these objects would not have been achieved by a rights issue to our own members which, in view of the limited number of shares and the price of issue, would not have been a practical proposition.

Encouraging Outlook

The outlook for the future is encouraging. Results for the first five months of the current financial year have been fully up to expectations. Profits of the operating gold and copper mines have been increasing and the platinum companies have resumed the payment of dividends. If this is maintained there will be a further increase in our investment income and it should also be reflected in the results of our new subsidiaries. Operating conditions in South Africa where our main interests lie are favourable.

The Report was adopted and the absorption of New Consolidated Goldfields Limited approved.

PAHANG CONSOLIDATED

CONFIDENCE JUSTIFIED

The fifty-third annual general meeting of The Pahang Consolidated Co., Ltd., was held on December 10 in London, **Mr. J. N. Davies,** chairman, presiding.

The following is an extract from his circulated statement for the year ended July 31, 1959:—

In view of the difficulties which have beset the Tin Mining Industry and the heavy restriction upon output imposed under the International Tin Agreement your Board presents the accounts for the financial year 1958/59 with a measure of restrained satisfaction.

The stringent economy measures in respect of general mining expenditure introduced by your Board last year following the imposition of restriction, were of necessity continued throughout the year 1958/59. It was only due to these measures that the satisfactory results now under review were attained.

There is a net profit for the year of £101,670. Dividends of 7 per cent on the Preference and 2½ per cent on the Ordinary Stock have already been paid and a final dividend of 10 per cent on the Ordinary Stock is recommended.

Your subsidiary Company, The Kuala Reman Rubber Estates Limited, continues to make steady progress and good profits are now being earned.

In my last address I ventured to express the view that, providing world consumption was maintained at least at its present level and effective control of production continued, the outlook for the Tin Industry would improve. Developments during the year under review have justified my confidence. However, with so many unknown factors such as lack of statistical information from Russia and China and with a control scheme in operation, it is difficult, if not impossible, to forecast the future with any degree of confidence, but at the moment the outlook for Tin is distinctly encouraging.

Chairman's Additional Remarks

Addressing the meeting, the Chairman said:

Full scale working at our Mine was resumed in mid-November, in anticipation of an increase in tin export quotas. As you will now know, the International Tin Council at its recent meeting fixed the quota for the first quarter of 1960 at 36,000 tons, an increase of 6,000 tons over the current period and your Board considers the anticipatory action taken by them in resuming full scale working in November now fully justified.

I must also mention that during the evening of November 13 a cloudburst occurred in the Sungei Lembing area when some 4¼ inches of rain fell in 1¼ hours. This unfortunate occurrence caused considerable damage to our road and rail communications for some four miles out of Sungei Lembing. However, rehabilitation work is proceeding satisfactorily and in fact by now the railway will be in full operation once more.

The report and accounts were adopted.

LONDON & AFRICAN MINING TRUST

The twentieth annual general meeting of London and African Mining Trust, Ltd., was held on December 15, in London

Mr. W. J. C. Richards, Chairman, presided.

The following is his Statement circulated with the Report and Accounts for the year ended September 30, 1959:—

The working profit for the year £20,392 exceeds that of the previous year by £4,502, and we recommend increasing the dividend from 10% to 12½%. The improved profit arises from a bigger portfolio of quoted investments, nearly 50% larger than at the beginning of the year, made possible to some extent by the ending of the credit squeeze. Last year, the Balance Sheet valuation of our quoted investments was £6,366 higher than the Stock Exchange quotation; this year the Stock Exchange quotation is £32,843 more than the Balance Sheet valuation. We have reduced the proportions of our investments in oil and tin and increased them in commercial and industrial companies and rubber plantations.

Our unquoted investments consist mainly of our interest in the lead-zinc mine in Eastern Nigeria, and it is represented by debentures and shares in Mines Development Syndicate (West Africa) Limited. With a view to finding capital to equip the mine to the production stage, Mines Development Syndicate (West Africa) Limited revised its capital structure, and the reduced nominal value of our holding is shown in our Balance Sheet. The proportion of our holding remains unchanged and the prospects of raising capital for the venture are brighter than they have been for several years. During the year another independent report was made on the mine and it is entirely satisfactory. Your Directors remain convinced that this will prove a sound investment.

The Report and Accounts were adopted.

THE LAMPA MINING CO. LTD.

The Annual General Meeting of The Lampa Mining Co. Ltd. was held in Liverpool on December 16. The following is an extract from the circulated statement by the Chairman, **Mr. J. Shirley Esplen:**

The Company may be said to have had a prosperous year. The main reason for this has been the improvement in the price of Copper and the decline in the external value of the Peruvian sol. This has widened the margin between our cost of production and the values realized for our product, but it has brought in its train, as usual, the necessity to make provision for a considerable loss on exchange due to the depreciation in sterling of all our Peruvian assets which are valued in soles.

Nevertheless, the final result will not, I think, be considered unsatisfactory. It has enabled us to recommend a Final Dividend of 15% less income tax, which makes a total for the year of 20% less income tax on an increased capital. In addition, we have made a substantial addition to reserves, and have restored some part of the undistributed surplus which we had to "raid" for dividend purposes last year.

Turning to the Balance Sheet, the principal changes are in the issued capital which has been raised from £105,000 to £140,000 as a result of the Bonus Share Issue made during the year, and the increase in the book value of our mining properties arising from the purchase of the San Rafael Mine. We have provided the usual depreciation of £2,000 on our Berenguela Mine, but in addition we have thought it prudent to write £10,000 off the book value of San Rafael. This is purely a measure of financial caution.

The purchase of San Rafael has had the result of reducing the surplus of current assets over liabilities as compared with last year but the Company's financial position is, however, still a strong one.

The Report and Accounts were adopted.

NORTH KALGURLI (1912)

MINE IN GOOD SHAPE

The Annual General Meeting of North Kalgurli (1912) Limited, was held on December 16 in London, **Mr. H. A. Kemlo** (Chairman of the Company), **presiding.**

The following are extracts from his circulated statement for the year ended March 31, 1959 :

This year our accounts cover 13½ four-weekly periods, bringing us to the end of March, 1959. The current year will run to March 29, 1960, and at the end of the year, and at the beginning of the following year, our returns will cover periods of six weeks so as to eliminate the additional office work involved in preparing returns for the two full periods and the two half periods.

Production Figures

We treated 361,213 tons of ore producing 84,770 ounces of gold, as against 340,204 tons for 75,185 ounces last year. We also treated 1,819 tons of stored concentrates producing 4,107 ounces of gold. Our gross mining income after allowing for the reduction of the concentrates stockpile was £1,075,027 against £953,111 last year, and our net profit was £162,827 against £143,462. The net profit was adversely affected by rising costs outside our control, including full provision for the accumulated liability for Long Service Leave pay.

It is proposed to repeat last year's final dividend of 6*d.* a share making 10½*d.* a share for the year. This dividend will take £82,500 including tax, leaving a carry forward of £35,035 against £18,280 brought forward from last year.

Chairman Visits Kalgoorlie

In September and October of this year I paid a visit to Kalgoorlie, and this is why there has been a slight delay in the presentation of the accounts. The Mine is in good shape and we can be reasonably confident about the future, though we have to bear in mind that any further rise in costs over which we have no control must necessarily affect our margin of profit. As regards Mine Development, an estimate of the residual development footage available from existing mine horizons made in July of this year indicates a total of 40,000 feet. This is based on a " Schedule of Development Objectives " which lists all currently known ore prospects within the mine and covers probable extensions of known lodes and any ore intersections exposed by diamond drilling up to June, 1959.

Similar assessments made in previous years are :—

1955	...	...	38,400 feet
1956	...	...	41,200 ,,
1958	...	...	39,000 ,,

At 15,000 feet per annum of normal development work, i.e., work directly concerned with opening up new ore, the estimate of 40,000 feet gives 2.7 years ahead. The schedule does not provide for work north of Main Shaft at Nos. 17 and 18 levels which would add a further 4,000 to 5,000 feet, and the total development expectancy represents three clear years ahead. Additional objectives will undoubtedly be exposed by diamond drilling and will increase the overall figure, possibly by several thousand feet.

This immediate or short range development potential is reassessed each year and has not changed basically over the past five years by virtue of the fact that, as various projects have been completed, new objectives have been brought in by diamond drilling and, in addition, the sinking of Main Shaft has provided additional levels for development of the East Lode System and of the Main and West Branch Lodes.

Development Objectives

A substantial portion of the listed development objectives are in quartz dolerite greenstone and these include a large number of projects extending from No. 2 to No. 15 level in Main Shaft, and from No. 1 to No. 19 level in the Kalgurli Shaft. In addition there are still a number of areas to be covered by closely spaced diamond drill bores. It will be several years before all projects in quartz dolerite are exhausted.

On a long term view the extension of development work into calc schist will become increasingly important. To the north of Main Shaft there is a proved penetration of ore into calc schist which is partially controlled structurally by a system of east dipping strike faults. This condition is, so far, known to occur only on the North Kalgurli Mine and the established penetration of ore from the quartz dolerite margin is from 1,500 to 2,000 feet. Diamond drilling bores between the Croesus and Main Shaft workings indicate the presence of further mineralization and there is an additional length of 2,500 feet of ground to be explored with a possible initial depth range of 1,000 to 2,000 feet.

Current development in calc schist includes testing of downward and lateral extensions of known lode systems therein, a drive northwards from No. 13 level Main Shaft into the Union Jack Lease and an exploratory south drive from No. 9 level of Croesus Shaft. Future policy will be determined by the results obtained.

Tungsten Prospects

Reviewing the overall developmental scope, the immediate and long term prospects offer a wide range of objectives which, with careful planning, should ensure maintenance of ore reserves for many future years. Admittedly, the problem of ore finding in calc schist is and will be greater than in the quartz-dolerite, but the known penetration of ore into calc schist as established over the past ten years is adequate indication that profitable shoots will continue to be found. Furthermore, the Croesus Section has responded well to development since it was reopened in 1956 and the depth prospect in that section should prove a major source of ore.

Ore Reserves. These have been calculated over the past eight years as :

		Long Tons	*Average Value*
Dec.,	1951 ...	2,183,162	5.62 dwt.
Dec.,	1952 ...	2,234,415	5.57 ,,
Dec.,	1953 ...	2,265,193	5.51 ,,
March,	1955 ...	2,269,049	5.57 ,,
March,	1956 ...	2,217,473	5.41 ,,
March,	1957 ...	2,244,482	5.38 ,,
March,	1958 ...	2,271,329	5.41 ,,
March,	1959 ...	2,283,266	5.42 ,,

Fundamentally there has been little change and it is probable that the current year's picture will be in the same order both as regards tonnage and value.

The Report and Accounts were adopted.

Publications Received

Pulse. Booklet pp. 30, printed and published by Kelvin and Hughes (Industrial) Ltd. This is the first number of a publication which should appeal to those interested in non-destructive testing equipment and electronic instrumentation. Among articles in this first issue is one entitled " Investigation into the Welding of Rare Metals " which records voltage and current variations during research into arc welding of rare metals.

Flat Rolled Products : Rolling and Treatment. Vol.1. Metallurgical Society Conferences. pp. 128, edited by T. E. Dancy and E. L. Robinson, published by Interscience Publishers, London and New York. Price 30s. This book presents the proceedings of a technical conference sponsored by the Mechanical Working Committee of the Iron and Steel Division, The Metallurgical Society, and Chicago Section, American Institute of Mining, Metallurgical and Petroleum Engineers. This volume is the first of a series which will report the proceedings of a technical conference sponsored by the Metallurgical Society of AIME or one of its technical committees.

Trading with the Soviet Union. Obtainable from the Russian Department, London Chamber of Commerce, or any Chamber of Commerce affiliated to the Association of British Chambers of Commerce, price 5s. This new guide for British firms describes the Soviet trading system, lists machinery and equipment for possible import into the Soviet Union from the U.K., and gives the latest trade figures, as well as much other relevant information.

The Economic Geology of the Stirling and Clackmannan Coalfield Scotland, Area South of the River Forth. Coalfield Papers of the Geological Survey of Great Britain, No. 2. Published by the Department of Scientific and Industrial Research, H.M.S.O. Edinburgh, 7s. This publication is the second, planned to supplement " Economic Geology of the Stirling and Clackmannan Coalfield " (Mem. Geol. Surv., 1932), the first, dealing with the area north of the River Forth, having been published in 1956. The present revision was undertaken between 1952 and 1955 by W. A. Read, who has written the bulk of this publication. The section on the palaeontology of the Limestone Coal Group, Upper Limestone Group and Millstone Grit has been written by R. B. Wilson.

Tungsten Deposits of Canada. by H. W. Little. Geological Survey of Canada, Economic Geology, Series No. 17. Published by Department of Mines and Technical Surveys, pp. 251 plus maps. Price $1.50. Tungsten ores in Canada have been mined, with minor exceptions, only under the stimulus of wartime production, or stockpiling. This report includes considerable unpublished information and, it is hoped, all of the significant published data concerning tungsten - bearing deposits in Canada up to the end of 1953.